LITERATURE OF MANUFACTURERS

Catalogues, bulletins and other direct advertising material recently issued.

Manufacturers are requested to send copies of new trade literature promptly to Electric Refrigeration News.

Crouse-Hinds

Catalog 2200, a bound volume of 280 pages, listing condulets, groundulets, plugs and receptacles, was published Nov. 1, 1929, by Crouse-Hinds Co., Syracuse, N. Y. This catalog supersedes all previous listings. Crouse-Hinds' condulets are made of "Feraloy," a special cast metal which possesses high tensile strength and resistance to corrosion.

Frankenberg

Several types and sizes of Frankenberg refrigerating units are described in a small folder issued by Frankenberg Refrigeration Co., Main and Florida Sts., Belleville, Ill. These units use either sulphur dioxide or ammonia and are designed for both expansion and brine tank installations.

Frig-O-Matic

A line of self-contained refrigerators is illustrated in folder No. R-100, issued by Frig-O-Matic, Ltd., Brantford, Canada. Models 7-P and 9-P, illustrated in the folder, have exterior finishes of white enamel and interiors of porcelain. Model 7-E is finished both inside and out in white enamel.

General Utilities

General Utilities Co., Bangor, Maine, has issued a folder illustrating its standard refrigerator models for residence and apartment house use. The food capacities of the various models range from 4 to 15 cubic ft. and have an interior of either porcelain or enamel while the interior is either lacquer or porcelain.

Jack Frost

A leaflet describing compressor Models 200 and 400 has been distributed by Jack Frost, Ltd., Toronto, Ontario, Canada. These models have ice melting capacities of one and two tons, respectively, water consumption of 90 and 180 gallons per hour, a motor imput of 1.5 K.W. and 3 K.W.

Day and Night

A booklet published by Day & Night Water Heater Co., Ltd., Monrovia, Calif., describes a Day & Night storage water cooler. This cooler, designed for Kelvinator electric refrigeration, consists of a heavy gauge steel tank, in which is inserted a cooling unit provided with metal fins to increase heat absorption from the water. All joints are hermetically sealed by electric welding. No bolts or gaskets are used in attaching refrigerating sleeve to water cylinder.

Warner

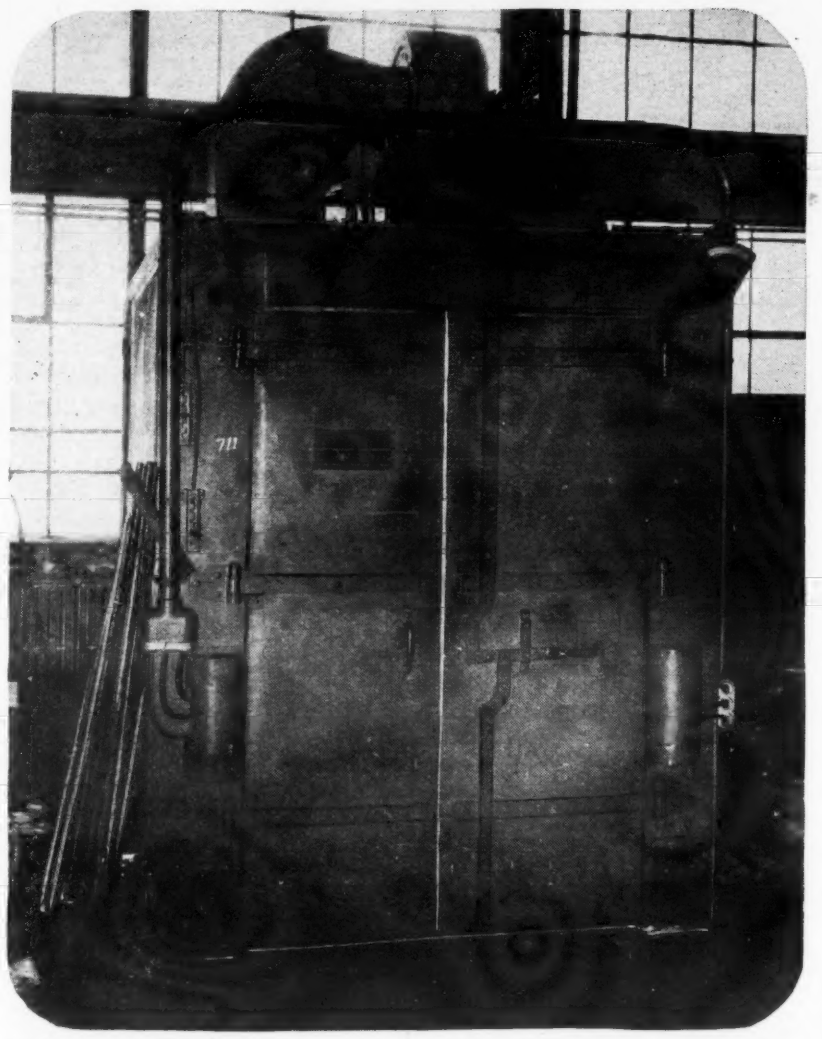
Nine compressor models, four water cooler models, three ice maker models, twelve cabinet models and ten flooded type cooling coil models are illustrated in a catalog issued by Warner Steel Products Co., Ottawa, Kansas, manufacturers of Surecold refrigerating equipment.

Webb

Slingabout jackets, made in sizes to fit all makes of refrigerators, are described in a leaflet issued by Charles J. Webb Co., Philadelphia, Pa. These jackets, made for delivery purposes, are constructed with heavy canvas outside, and a soft, flannel lining. Slings of 3-ply canvas belting, copper riveted, keep the enclosed refrigerator from slipping, besides offering convenient hand-holds.

The Slingabout is reinforced with harness leather. It is easily put on and taken off, and eliminates the necessity of crating the refrigerator.

Panel Oven Has Varied Uses in Refrigeration Industry



INSULATED steel panel oven for use in drying refrigerator coils before they are filled with the refrigerant. The oven is made by Young Bros. Co., Detroit, Mich. This company also makes ovens for baking finishes on refrigerator parts and drying metal parts preliminary to vitreous enameling.

REQUESTS FOR INFORMATION

Readers who can assist in furnishing correct answers to inquiries, or who can supply additional information, are invited to address Electric Refrigeration News, referring to the query number.

Thermostats

Query 316 (from Paris, France)—"Will you be kind enough to give me the names and addresses of American firms manufacturing thermostats for refrigerators, especially the Mercoid? In this case, I shall be glad to receive their literature and prices. (Price for a sample and price on 25, 50, 100, 500, 1,000)."

Australian Prospect

Query No. 317—"I am planning to develop a manufacturing or assembling business in Australia and would be pleased to receive literature, engineering data, and the best possible prices for export in various quantities from manufacturers of refrigeration equipment and materials, such as compressors, switches, condensers, tubing, valves and fittings, cooling coils, trays, V-belts, sulphur dioxide gauge and accessories, and sulphur dioxide.

"Due to the amount of time consumed in delivering the mail from the United States, I would appreciate receiving complete information on everything entering into the complete electric refrigeration system for domestic, multiple apartment and commercial fields, except cabinets and electric motors."

OIL BURNER SALES NEAR MILLION MARK

Bloomington, Ill.—New records in the use of oil fuel, with the largest number of oil-burner installations in the industry's history will be set within the next few months. By late winter close to 1,000,000 homes of the United States will be deriving their heat from liquid fuel, according to C. U. Williams, president of the Williams Oil-O-Matic Heating Corporation.

Two contributing reasons are assigned by President Williams for the speed with which oil is superseding old-fashioned heating methods everywhere in North America, and is beginning to enjoy a vogue in many foreign countries.

"Compilation of figures from widespread sources reveals oil prices are favorably low," he said. "Tremendous production in spite of all efforts to reduce it serves to keep down prices everywhere. Americans are turning to clean, mechanical heating with liquid fuel also because for the first time it is available for every home and pocketbook."

FARM BULLETIN DISCUSSES CARE OF FOOD IN HOME

Washington, D. C.—Department of Agriculture has issued Farmers' Bulletin No. 1372, entitled, "Care of Food in the Home." This bulletin is a revision of and supersedes Farmers' Bulletin No. 375.

Under the heading, "Causes of Spoilage," the bulletin deals with bacteria, yeasts, molds, changes produced by heat, cold, light and loss or absorption of moisture, insects and other household pests and parasites of food animals. Suggestions for storage of foodstuffs are made under the following topics: storerooms, containers, and special means of keeping foods cool.

Care of different kinds of food, such as milk, dairy products, fresh meat, fish, poultry, eggs, left-over cooked foods, fresh fruits, vegetables, cooking fats, table oils, baked goods, dry foodstuffs and canned goods is also given in the bulletin.

BOOKLETS COVER MODERN SALES METHODS

Four booklets, each containing an address delivered at Mississippi Valley Manufacturers and Wholesalers Conference, which was held at St. Louis, Mo., April 17, 1929, have been sent to members of National Electric Light Association by the New York headquarters office.

The subjects and speakers are as follows: "The Changing Scene in Marketing," James L. Madden, third vice-president Metropolitan Life Insurance Co., New York, N. Y.; "Up-To-Date Merchandising from the Wholesalers' Point of View," S. M. Bond, president Wholesale Dry Goods Institute, Cleveland, Ohio; "Research as an Aid to Improved Sales Methods," Marshall E. Sampsell, president Central Illinois Public Service Co., Chicago Ill., and "Effective Sales Administration and Profits," Frank S. Rand, president International Shoe Co., St. Louis, Mo.

Mississippi Valley Manufacturers and Wholesalers Conference was sponsored by eleven organizations of industry and commerce in the Mississippi Valley in co-operation with the Metropolitan Life Insurance Co., New York, N. Y. The eleven organizations sponsoring the conference included Associated Industries of Kansas, Kentucky, Missouri and Oklohoma, Manufacturers Associations of Iowa, Nebraska, Tennessee, Texas State and Arkansas, St. Louis Chamber of Commerce and Industrial Club of St. Louis.

BEST KNOWN

Your publication is the best known and most important medium of the electric refrigeration industry.—Wm. H. Schladitz, commercial manager, Arnold-Ervin Co., Davenport, Iowa.

THE CONDENSER

ADVERTISING RATE fifty cents per line (this column only).

SPECIAL RATE if paid in advance — Positions Wanted — fifty words or less, one insertion $2.00, additional words four cents each. Three insertions $5.00, additional words ten cents each. All other classifications—fifty words or less, one insertion $3.00, additional words six cents each. Three insertions $8.00, additional words sixteen cents each.

POSITIONS AVAILABLE

WANTED — Salesmen acquainted in grocer and meat trades to sell commercial refrigerators, counters, etc. Box 248, Eau Claire, Wis.

WANTED — Experienced Frigidaire salesmen, 4 household and 2 commercial. Account of warm climate and tourist business this is our best sales season. Address W. H. Forgy, Sales Manager, 102 E. Lafayette Street, Tampa, Florida.

POSITIONS WANTED

WANT Permanent Southern or Southwestern Connection. Ten years in sales and sales management work. Last three years and at present with one G. E. distributor in Northern state. Experience in all phases of sales work—retail management, dealer and utility contact and salesmen training. Now employed. Box 216.

EXPERIENCED REFRIGERATION ENGINEER—Desires to get in touch with refrigeration manufacturer requiring the services of a chief engineer. Thoroughly versed in engineering, design and production methods. More than ten years' experience in electric refrigeration. Will consider any locality—Detroit or vicinity preferred. Address Box No. 217.

CHIEF ENGINEER, with ten years' electric refrigeration design, development, and production experience, wishes to get in touch with a manufacturer. Box 203.

SALES EXECUTIVE — Familiar with factory and branch refrigeration sales, will be at liberty January 1st. Possesses good record and can furnish good references. Address Box 220.

AVAILABLE—Chief Draftsman on refrigeration work, experienced on household and commercial units, ice cream cabinets and water coolers. Address Box 222.

MISCELLANEOUS

FOR SALE—One model Ten and one model Five Excelsior compressors in original factory crates. We have discontinued refrigeration and will sacrifice these new machines to move them before December 31st. Will accept any reasonable offer. Terms, 25 per cent with order, balance sight draft. Box No. 215.

FOR SALE—50 Colonial (with lids) and 50 United (without lids) 5-foot cabinets, 2" cork lined, Duco finish, all white. All new, good condition, will accept any reasonable offer for entire lot. Box 221.

FOR SALE—State or entire U. S. rights for improved and proven ammonia pre-cooler for ice, ice cream, fruit pre-cooling and dairy plants. Sells for $250 to $375—marvelous results. Arrange for several states—manufacture on large scale. Blue prints, descriptive matter. Refrigeration Improved Appliance Co., Winter Haven, Fla.

Subscription Order

ELECTRIC REFRIGERATION NEWS
550 MACCABEES BUILDING, DETROIT, MICH.

Please enter subscription to Electric Refrigeration News.

United States and Possessions:
☐ $2.00 per year. ☐ Three years for $5.00

All other Countries:
☐ $2.25 per year. ☐ Two years for $4.00

I am enclosing payment in the form of
☐ Check ☐ P. O. Order ☐ Cash

Name.....

Street Address.....

City and State.....

Remarks:.....

ELECTRIC REFRIGERATION NEWS

The business newspaper of the refrigeration industry

VOL. 4, NO. 9, SERIAL NO. 85 | Copyright, 1929, by Business News Pub. Co. | DETROIT, MICHIGAN, JANUARY 1, 1930 | Entered as 2nd class matter August 1, 1927, at Detroit, Michigan. | PRICE FIFTEEN CENTS

COPELAND DEALERS TO VISIT FACTORY AND SEE NEW LINE

Mt. Clemens, Mich.—More than 500 distributors and dealers are expected to attend the annual two-day sales convention of Copeland Products, Inc., to be held in the Players' Club, Detroit, Jan. 13 and 14.

Headquarters of the gathering will be at Hotel Statler, Detroit. The first day of the convention and the morning of the second will be given over to business meetings. An inspection trip will be made through Copeland's new factory on the afternoon of Jan. 14, and in the evening the visitors will be guests of the company at the annual entertainment and banquet at Hotel Statler.

W. D. McElhinny, vice-president in charge of sales, will be general chairman of the convention, and C. W. Hadden, of the executive staff, will be general manager of the meeting. Other officers who will take an active part in the convention are William Robert Wilson, chairman of the board of directors of Copeland Products, Inc.; Louis Ruthenburg, president, and Edwin H. Brown, vice-president, secretary and treasurer.

Addresses will be made by Messrs. McElhinny, Hadden, Ruthenburg, Wilson and Brown; Carleton Smith, assistant secretary-treasurer and comptroller; Edward Hughes, factory manager; Edward Barger, in charge of engineering; H. Brysselbout and D. B. Henry, commercial engineering; F. N. Pattison, manager of the dealer development department; Harry Newcomb, service manager, and W. S. Race, manager of advertising and sales promotion.

During the convention the winners in the Copeland national sales contest, which closed January 1, will be announced, and eight specially designed loving cups will be awarded.

N. E. L. A. REFRIGERATION COMMITTEE TO MEET IN BIRMINGHAM, JANUARY 20

Newark, N. J.—F. D. Pembleton, chairman of the Merchandising Bureau, Commercial National Section of the National Electric Light Association, announces that a private car has been chartered to be attached to the "Birmingham Special" leaving New York City Saturday, January 18, for Birmingham, Ala., where the N. E. L. A. Refrigeration, Electric Range and Electric Water Heating Committees will meet during the first two days of the following week.

The train leaves New York City at 11:10 a. m., Newark 11:31 a. m., West Philadelphia 1:17 p. m., Baltimore 3:20 p. m., and Washington 4:35 p. m. It arrives in Birmingham Sunday, January 19, at 2:35 p. m.

Announcement is also made that delegates desiring to attend the N. E. L. A. Executive Committee meeting, which will be held in Chicago on January 23, will be able to leave Birmingham at 12:20 p. m. on Tuesday, to arrive in Chicago at 9:20 Wednesday morning, or they may leave at 8:50 Tuesday evening to arrive in Chicago at 4:25 Wednesday afternoon.

Among the subjects for discussion by the N. E. L. A. Refrigeration Committee will be the National Food Preservation Essay Contest, which was held in September. Winners of the principal prizes in the contest were announced in the last issue of the NEWS.

REPORT NOTES BIG GAIN IN MULTIPLE SYSTEMS

In a review of Underwriters' Laboratories activities for 1929, two reports of interest to the refrigeration industry are given. One concerns temperature controls, while the other has to do with the testing of multiple and self-contained units.

The report on controls for refrigerators follows: "There are now five listed manufacturers producing temperature or pressure-actuated control devices for starting and stopping a refrigerator machine in accordance with a definite temperature regulation requirement. As these units must operate many times a year in controlling the refrigeration cycle, their reliability under repeated operation test is a prime factor in their investigation."

Concerning the testing of multiple and self-contained units, the report states: "The outstanding feature of the year has been the widespread adoption of the multiple unit system in apartment buildings. In such systems a central power unit, in the basement, supplies refrigerant directly to many cooling units in refrigerator boxes throughout the building. This has presented many problems of design and installation of equipment to safeguard the public against accidental escape of refrigerant. The whole question has been agitated by several deaths alleged to have been caused by escape of refrigerants in small apartments. A safety code of national scope is being prepared and is about ready for final action under the procedure of the American Standards Association. This code covers fully the various types of installation, including the multiple type. It is probable that the Laboratories will be called upon to review much additional equipment under the new safety code rules.

"Single-unit, self-contained refrigerators are continually submitted for test. New clients are being listed and new models of machines made by listed clients are coming in as a result of the quarterly Re-examination Service program carried out by department engineers at the factories."

FRIGIDAIRE REPORTS UNIT STILL RUNNING AFTER 67,728 HOURS

Dayton, Ohio—A Frigidaire, placed in operation in the engineering department of that corporation about a year after its plant was moved from Detroit to Dayton, has been running 2,822 days or 67,728 hours. This, engineers explain, is equivalent to nearly 31 years' actual use in a home. The unit is the subject of a life test.

Keeping Cool With Coolidge

Springfield, Mass.—Calvin Coolidge, former president of the United States, once more has chosen not to run. The first time that happened he resolutely declined to pick some one to run for him, but this time he has altered his policy. When confronted by the perils of running the gantlet of bacteria, yeast and molds, he not only chose to step aside, but took a step forward and chose a Kelvinator to undertake the job.

The Kelvinator, a D-11 unit, which has just been put into operation in the Coolidge home at 21 Massasoit St., Northampton, Mass., was sold and installed by Springfield Kelvinator Sales, Inc.

Westinghouse Electric Refrigerator To Be Put On Market February 1st

Plan To Sell First Year's Output of 25,000 Units in Northern States East of the Mississippi

FIVE SIZES; MACHINE IS HERMETICALLY SEALED; NEW TYPE FORCED DRAFT

Mansfield, Ohio—After years of study and preparation of the most thorough and painstaking character, the Westinghouse Electric & Manufacturing Company will actively enter the electric refrigeration field on February 1, 1930. On that date five distributors, long associated with the merchandising of Westinghouse products, will make simultaneous displays of the new Westinghouse electric refrigerators in their territories. The line consists of complete, self-contained units in five sizes, ranging from 5½ cu. ft. to 17 cu. ft. All of the cabinets are of uniform height (5 feet) and depth, the width being the only variable dimension in the different sizes of units. Many novel features are incorporated in the design of both the refrigerating apparatus and the cabinets.

Plans of the Westinghouse Company call for the production of 25,000 units during the first year, and all of these will be distributed east of the Mississippi River and north of the state of Virginia. This localized selling effort has been decided upon as a fundamental feature of the Westinghouse merchandising plan, and will enable the headquarters organization to maintain the closest supervision of the distributing organization. The limitation of territory also indicates that the manufacturing organization intends to maintain a watchful vigil over the operation of all units installed until the record of performance has demonstrated that every detail of the design is correct.

Distributors who will open the retail selling campaign on February 1 are located in Detroit, Pittsburgh, Cleveland, Rochester, N. Y., and Canton, Ohio.

Periodically during the year new distributing centers will be established in other principal cities such as Columbus and Cincinnati, Ohio; Louisville, Ky.; Philadelphia, Pa.; Washington, D. C.; Baltimore, Md.; New Haven, Conn.; New York City, N. Y.; Newark, N. J.; Boston, Mass.; Indianapolis, Ind.; Nashville, Tenn., and Chicago, Ill.

The distribution plan calls for a general distributor in each principal territory under which dealers will operate in the outlying communities. In most cases the general distributor will not operate a retail business in the principal city served. Under this plan provision is made for a "metropolitan distributor," who will handle retail sales in the same city in which the general distributor is located. The Pittsburgh setup is an example of this plan in that a leading electrical company will be the general distributor, while the metropolitan distributor will handle retail sales throughout the city.

Heading up the refrigeration business of the Westinghouse Company at Mansfield, Ohio, is Carl D. Taylor, manager of the Department. Under Mr. Taylor are Ralph Gates, sales promotion manager; J. E. O'Donnell, sales supervisor; L. K. Baxter, service manager; J. J. Dorney, assistant to Mr. Taylor; John Haley, in charge of warehousing and stocks; K. K. Gordon and Arthur Vassar, service; H. B. Winslow, W. N. Kennon and R. L. Sanner, sales promotion; T. J. Newcomb and J. W. Johnston, sales, and Miss Olive Kaiser, home economics.

Three features have been selected for emphasis in the trade and consumer advertising of the Westinghouse unit. They are: (1) the buffet top, (2) the temperature selector, and (3) the broom high legs. Among other features of the new unit are forced draft ventilation produced by a fan which is operated magnetically by the motor; also the design of the cabinet which permits the installation of the mechanism by opening a panel in the front. Because of this feature the cabinet first may be placed in position in a kitchen, and the unit may then be installed by simply lifting it out of the crate and sliding it into the opening.

The Westinghouse Idea

EARLY AMERICAN SIMPLICITY WILL MARK SHOW ROOMS

ANALYZING the merchandising plans for the Westinghouse electric refrigerator, as well as the design of the unit, it is evident that this big company, which is just now entering the field, intends to capitalize to the fullest extent upon the experience of other companies. It is also entirely clear that the Westinghouse people are prepared to adopt new and original methods wherever it is necessary as a means of distinguishing their product from that of competitors.

Considering the fast pace which has been set by the electric refrigeration industry in the direction of window and store display, the Westinghouse Company was confronted by no easy task when it came to the problem of putting a distinctive atmosphere around the product in the show room of the dealer. Instead of attempting to surpass the elaborate decorative effects which have been achieved in the display of other makes, Westinghouse elected to surround its product by the utmost in simplicity.

To secure the desired effect, the early American kitchen was taken as the motif in the decorative scheme. Wall paper on the wall, rag rugs on the floor, a few pieces of maple furniture, including a drop-leaf table and cane bottom chairs, are the principal items selected to give an easy, home-like atmosphere to the store.

The general arrangement illustrated above is typical. The prospects having selected the size of unit which will best meet the requirements of their home, they find easy chairs immediately at hand. Quite naturally the salesman also draws up a chair and lays the order blank on the table before them.

MODERN DEMANDS AND EXPERIENCE DICTATE DESIGN

NO matter how carefully a device is designed and built, it will not give good service unless it is in first-class condition when it is placed in operation. The only way that this can be achieved with the highest degree of certainty is to have the product leave the factory in final operating condition and require no other work being done on it during installation than to simply place it in position. This is very necessary in the case of an electric refrigerator, as a refrigerator is particularly subject to damage in installation if it is shipped from the factory with the motor-compressor unit separated from the evaporator. Elimination of this potential source of trouble may be accomplished by making the whole refrigerating unit one integral piece of mechanism, depending in no way on the cabinet to hold the parts in their correct relative positions.

The Westinghouse Company was keenly conscious of this situation, and, as a result, the most fundamental condition that was laid down in the designing of its refrigerator was that the whole machine be one integral unit; that is, that a unit structure be employed.

This construction, as worked out in

(Continued on Page 10, Column 3)

See Page 35 for Directory of Manufacturers. See Page 44 for Classified Directory.

FRICK SALES FOR 1929 SHOW 12.2% INCREASE

Waynesboro, Pa.—Frick Company's annual statement for the fiscal year ending October 31, shows total sales of $5,524,340 for 1929, as against $4,923,470 for 1928—an increase of 12.2 per cent. The company earned $9.87 per share on common stock, the figure for 1928 being $7.42 per share, after provisions had been made for all preferred stock dividends.

Confidence Prevails Among Leaders of Industry

Quinn of General Electric

NINETEEN-TWENTY-NINE was an excellent year for business. The sale of General Electric refrigerators went ahead rapidly. It is significant that each of the last three months of the year showed very substantial increases over the corresponding months of the previous year. We are not able to say that the stock market reverses had any direct effect on our business. It is probable that competition will be keener next year, and there may actually be fewer purchasing dollars, but these conditions need not noticeably affect the electric refrigeration industry.

With but few exceptions, the distributors and dealers in General Electric refrigerators made good profits for the year 1929, and we expect considerable improvement in 1930. Our general merchandising and advertising program will be more extensive and the spirit throughout the organization is to go about next year's job energetically and enthusiastically, with the conviction that the results will depend very much more upon ourselves than upon any outside conditions.

The market for electric refrigeration is still less than ten per cent sold. It is improbable that the industry, which has been making progress at an accelerating rate of speed, will be seriously retarded. The organization of manufacturers, which now includes all of the larger companies, will make for better understanding and greater stability of the industry.

We are pushing ahead in the sale of General Electric refrigerators along the lines already established, continually expanding and widening our market by the addition of many models to our lines and building our organization in the field upon the firm foundation of enlarged opportunities and returns in profit and compensation, proportioned to contribution, of every salesman, dealer and distributor everywhere. Our product has proven so eminently satisfactory that we are definitely counting upon our users to help us sell. We have produced a machine now owned by hundreds of thousands of families, not a single one of whom—after three whole years—has ever paid a cent for service or any other expense for repairs or trouble of any kind.

We shall expect the same percentage increase in the foreign market as we secure here.

T. K. Quinn, General Manager

Mason of Kelvinator

THE Kelvinator Corporation closed the fiscal year 1929 with a net profit of $1,221,384, with no bank loans. During the year it returned $170,000 of its 6 per cent gold notes. This, contrasted with losses in the previous year, is an indication of substantial progress. Shipments during the final quarter of 1929 were 44 per cent over those of the closing quarter of 1928.

2. At the home office of Kelvinator, the reflections from distributors and dealers are all in the direction of optimism and enthusiasm over the prospect for 1930.

3. Yes, the advertising program for 1930 is materially larger than that of 1929.

4. Kelvinator sees an ever-increasing market for its product. Public acceptance of electric refrigeration has become firmly established.

5. The September Food Preservation Campaign, the first concerted co-operative effort of the industry, was effective. It created a consciousness of the value and necessity for proper refrigeration.

6. Increased consciousness of the necessity for proper refrigeration, the better education of the public concerning it, and the gradual perfection of electric refrigeration are undoubtedly having a stabilizing influence.

7. Kelvinator brought out an entirely new line of domestic refrigerators late in 1929. While no material changes have been made in mechanical features, there are very important improvements and refinements, the most outstanding of which are Iso-Thermic Tubes for faster freezing. The commercial line has added some new units which meet demand and rounds out this line. Two, three and four-hole portable ice cream cabinets that meet the particular demand of the independent ice cream manufacturers are considered an outstanding achievement, and a flood of orders for these cabinets proves conclusively the wisdom of this development.

8. The outlook in the foreign field for Kelvinator is first class. The people in other countries are rapidly becoming more refrigeration conscious, and this is being reflected in rapidly increasing sales. Kelvinator is ably represented in foreign countries by the best type of distributors.

G. W. Mason, President

A Cross Section of Executive Opinion

IN order to secure an up-to-the-minute survey of business conditions in the electric refrigeration industry; to determine what effect, if any, stock market conditions have had upon sales; and to obtain a cross-section of executives' opinion regarding the outlook for 1930, Electric Refrigeration News addressed the manufacturers of electric refrigerators and cabinets requesting statements in answer to the following questions:

1. Has your business shown a substantial increase during the past three months over the corresponding months last year? Has the stock market "break" appreciably affected sales?
2. What attitude toward 1930 is reflected in latest reports from your distributors and dealers?
3. Will your general merchandising and advertising program be more extensive?
4. What are the major trends and developments indicating an enlarged market for refrigeration?
5. What have been the outstanding accomplishments toward understanding and co-operation within the industry during 1929?
6. What other influences are working toward the greater stabilization of the industry?
7. What essential changes in design of product, production or distribution methods will mark your activities next year?
8. What is your opinion concerning the results to be expected in the foreign field next year?

Berghoff of Wayne

WE have made some very decisive progress in our business during the past three months, although we had no great increase in volume. We have succeeded, however, in perfecting our distributor organization and were unusually pleased in the interest shown by old-established companies with high ratings.

2. We, of course, are very optimistic about the prospects of our business during 1930, because we now have good representation in almost the entire United States, and have always found that the success of one's business in a given territory is largely due to the character of the distributor handling our merchandise.

3. Our merchandising and advertising program will be far more extensive and will cover every month in the year, as our oil burners are sold during the off-season for refrigerators. We are firm believers that since refrigeration is no longer a luxury, the public will buy any month in the year if they are financially able, and are aggressively solicited.

4. We consider the acceptance of electric refrigeration as a necessity for preservation of food and health as the major development, causing an ever-broadening market. While the pride of ownership is still one of the best sales basis, refrigeration is now being taken as a matter of fact the same as plumbing.

5-6. We are making very few basic changes in the design of our product, as we feel that the industry has progressed to the point where satisfactory performance is common with all makes. We are now concerning ourselves about increasing efficiency, lowering the cost of operation and adding refinements that will increase the emotional appeal. One of the greatest strides we are making during 1930 is by supplying the cabinets that will give the minimum amount of heat loss. We have tried out Dry Zero insulation during the past eighteen months and have found it so satisfactory that we are now increasing the thickness of the walls to 3 inches in our leader so that our cabinets are almost 100 per cent more efficient than they were in the past, and which after all is the most economical way of maintaining a low temperature in the box.

7. We propose to market both our electric refrigerators and oil burners through distributors, and we are holding a sales convention at our factory on December 30th for sales managers only, when the entire new plan will be presented to them so that by the 1st of March our territories will have all been allotted. We are greatly surprised at the quality of distributors that are attracted to electric refrigeration this year, and it is no longer a problem of who you can get to sponsor the sales in the territory, but our problem today is one of choosing between the various classes of distributors and dealers who desire taking on our account. We, of course, find it necessary to solicit these outlets, but the sales resistance is much less, which we feel is due to the acceptance of electric refrigeration in general and also the fact that our company has made a strong effort to not only build quality merchandise but to give the dealers and distributors the necessary backing from both our sales and service department, to enable them to make a satisfactory profit. Our new plan for 1930 proposes to carry through to the consumer, and while we are limited to our rate of expansion, we are firmly wedded to the idea of doing a good job in one territory before endeavoring to expand.

8. Regarding export trade, we have been enjoying a very satisfactory year both from the point of volume and margin of profit. We anticipate a very large increase, as many of our foreign distributors have only perfected their distributing organizations, and are now prepared to do a volume business.

The refrigeration industry has an extremely favorable outlook, as the matter of cooling the food is only one of its fields of operation, and we are satisfied that in the very near future we will be prepared to issue room cooling equipment on a practical scale in conjunction with our oil heating equipment. It is merely a matter of temperature control and we anticipate a very heavy demand for room cooling equipment that can be adapted to the regular heating system, the same as our oil burners.

John A. Berghoff, General Manager

Additional Statements from refrigeration executives may be found on Pages 4 and 8.

McElhinny of Copeland

ALL indications seem to point to one of the best years the industry has yet experienced. Electric refrigeration is still in its infancy and its market is not more than scratched. But any hesitancy in general business that may have resulted from the stock market's recent reaction apparently has not and is not going to affect the electric refrigeration industry. An abundance of electric refrigeration business is awaiting an organization with a good product, an efficient sales force and a willingness to work.

Copeland is showing its confidence in the prospects for 1930—to say nothing of those in the more distant future—by moving into a much larger plant, concentrating on the work of building the most efficient field force in its industry, and making plans for a big increase in business in 1930 over that of 1929.

Copeland enjoyed an extremely satisfactory year in 1929. The 100% increase in our business in October over that in October last year was typical of the expansion we have experienced all this year. November business was very good, and it is still so in December, the period, normally, of annual slow-up. We are entering the new year at a rate of activity higher than ever before in our history.

W. D. McElhinny, Vice-President

Worker of American

OUR business has been about the same the last three months as the corresponding months last year. The break in the stock market had no appreciable effect on the sales.

2. Reports came in from salesmen, distributors and dealers, which show that 1930 business should be as good as 1929 and possibly a little better.

3. Our general merchandising and advertising program will be more extensive.

4. The major trend indicates a large market for refrigeration, which is the increased use of electric current and the continued reduction of rates in electric current.

5. The outstanding accomplishment during 1929 was the code effected in Chicago. The effect of this was to show the manufacturers of refrigeration equipment that they must co-operate and work together if this industry is going to show growth. Another outstanding trend is that many manufacturers are getting their production facilities in such shape that they have shown earnings the last year, against deficits the year before.

6. A better understanding as to the trade requirements for refrigeration equipment.

7. Our greatest activity this year will be in our distribution and sales activities for refrigeration units.

8. The foreign field shows great promise for increased results this year.

J. G. Worker, Assistant to the President

Biechler of Frigidaire

DESPITE the fact that our business during the past year far exceeded that of any previous year, we are definitely expecting a substantial increase in the year to come.

As to the business situation in general, it is very satisfactory. Inventories generally are low, which in itself is an excellent sign. Payrolls are high and the American public is earning and spending the same large amount of money as during the past year.

The year of 1929, which saw Frigidaire Corp. take long strides forward in the industry, was featured by the production of the millionth Frigidaire. This historical product was carried by airplane to Atlantic City and exhibited at the convention of the National Electric Light Association.

During 1929 Frigidaire brought out an electric room cooler, five new series of water coolers, new low-price models, and a series of commercial refrigerator boxes, designed for all types of retail institutions.

Building on the strength of an ever-growing demand for electric refrigeration equipment, and a belief that business conditions of 1930 will be good, our organization already has laid its plans for meeting a demand which is expected to exceed that of 1929. Factory capacity has been increased and other steps taken which reflect our confidence in future prospects.

In planning for still larger volume during the coming year, we are confident of our market and of our product. New applications of Frigidaire have been made during the past year, and new products developed to meet new needs. With a larger and more complete line of products than ever before, covering almost every conceivable refrigeration requirement, and with a constantly increasing public acceptance of Frigidaire, we are looking forward to a most successful business in 1930.

Members of Frigidaire's engineering department are constantly at work, developing products to meet the requirements of new users of refrigeration. Just as the cold control, the room cooler, and the commercial boxes were developed to fill a demand for equipment of these types, so are other products being designed with an eye to the necessities of the future, Biechler pointed out.

The aggressive sales policies which have characterized Frigidaire Corporation's rapid rise in American industry will be continued during the coming year, it was said, in order that this General Motors subsidiary may take full advantage of the favorable business conditions which 1930 is expected to bring.

E. G. Biechler, President and General Manager

Williams of Williams

OUR refrigeration department (Ice-O-Matic) is too new to make any comparisons in relation to the past. Our business in general, however, during the last three months exceeds the last three months of 1928. The stock market break has not appreciably reduced sales.

2. The dealer and distributor organization was never so optimistic as now.

3. In regard to your question as to whether our merchandising and advertising program will be more extensive—it certainly will.

4. It is reasonable to anticipate an enlarged market for electrical refrigeration, due to 6 per cent of the people having been served satisfactorily. It is only natural to expect the 94 per cent to be increasingly interested.

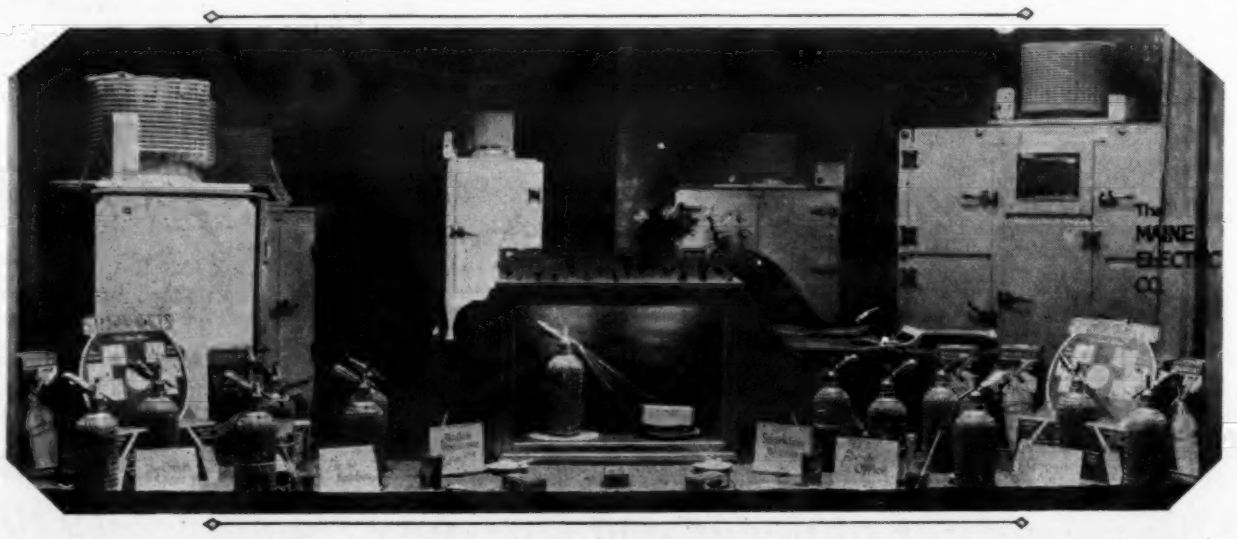
5. The first thing necessary to a better co-operation is a face-to-face meeting with our competitors, and our friend (?) Kegel certainly brought us together frequently. The industry should cash in on this acquaintance.

6. Influences working toward a greater stabilization of the industry are a better product mechanically, straightforward, honest dealings with the public, and, it is at least our hope, cleaner methods in competitive selling.

7. Our new semi-sealed refrigeration unit, a larger sales force and better coverage of domestic and foreign markets will mark our activities during the coming year.

8. The foreign field offers opportunities for education and development of no mean importance.

C. U. Williams, President



How Sparklet Syphons are Aiding the Sales of Electric Refrigerators

No owner has paid 1¢ for service

This statement means much to distributors, dealers and salesmen of electric refrigerators

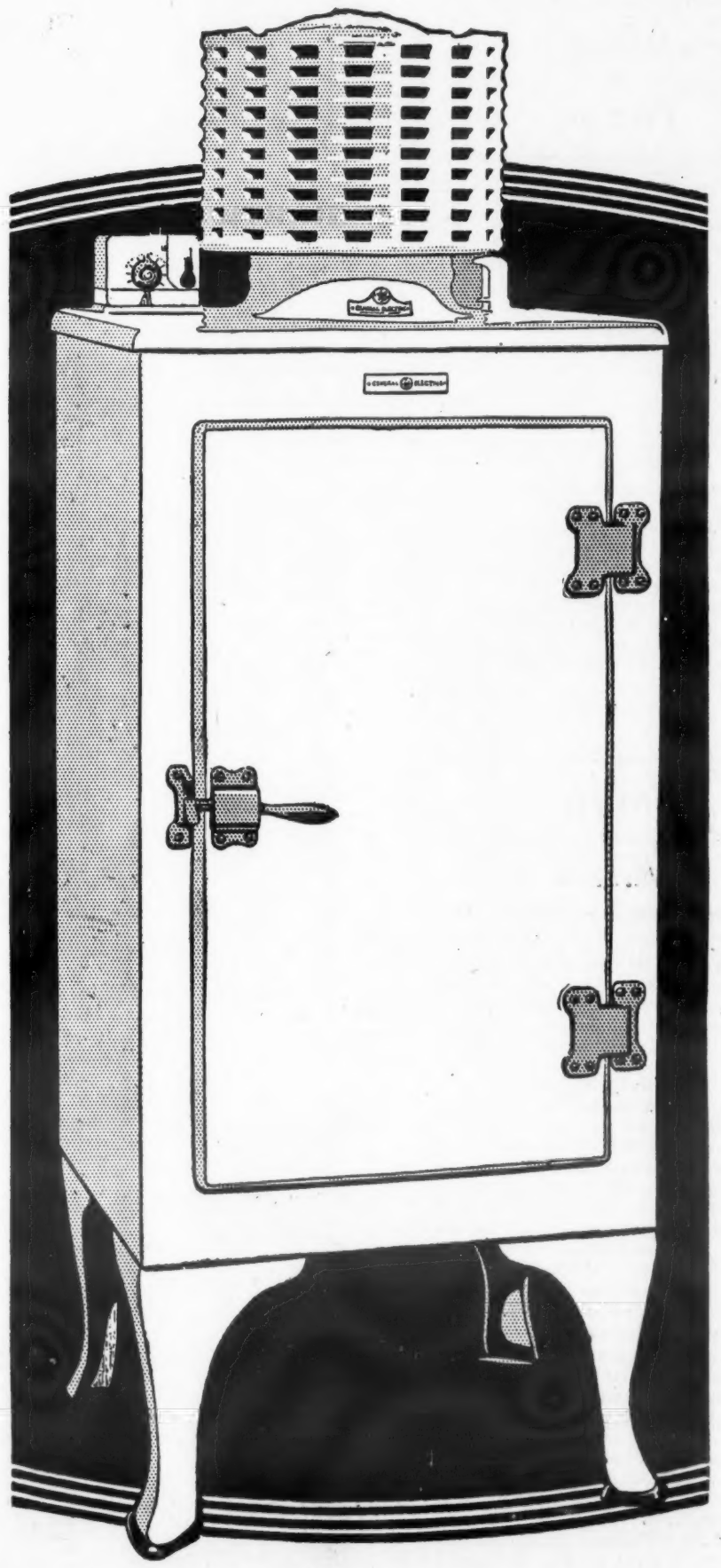
It means first of all satisfied customers.

And it means profitable business.

The main reason for the outstanding satisfactory performance of the General Electric Refrigerator lies in its hermetically sealed, permanently oiled mechanism—mounted on top of the cabinet. This quiet, supremely efficient mechanism is the greatest engineering contribution to modern refrigeration—and it is an *exclusive General Electric feature.*

The verdict of the vast buying public is the final designation of superiority. And that verdict in favor of General Electric is expressed by a decided preference, according to actual investigation, *much greater than for any other mechanical refrigerator.*

Great care has been used in the selection of distributors, dealers and salesmen of General Electric Refrigerators. No arrangement is ever made unless we believe a mutually profitable business will ensue.



GENERAL ELECTRIC

ALL-STEEL REFRIGERATOR

ELECTRIC REFRIGERATION DEPARTMENT OF GENERAL ELECTRIC CO., HANNA BLDG., CLEVELAND, OHIO

Hammond of Crystal

OUR production for use in connection with electric refrigeration is confined chiefly to to apartment house cabinets. The demand for these cabinets has declined quite substantially in the past few months, as compared with corresponding period a year ago. This is to be expected in view of the falling off in apartment house building.

There are some other causes which contributed to this decline, but they are of a mechanical nature relating to refrigerants used, and will undoubtedly be pretty well remedied this year.

Our selling connections are quite hopeful for a good volume of business for 1930. There should be as great a volume of refrigerator business the coming year as the past one, with pretty good prospects for an increased volume, due to the probable availability of funds for building operations now that the stock market has released money that will be seeking good investment.

Frank Hammond, President

Blood of Norge

IT is very obvious that public acceptance of mechanical refrigeration is greatly widening each year; and with the advantages and improvements offered in 1930 production, the dealers' opportunities should multiply many times.

Our thought is that the opportunities are so great that our future procedure is clearly that of the necessity of refrigeration and the advantages of our own type of product. We believe that this will be the attitude of all of the high-grade producers, with the resulting tendency to stabilize the buyer thinking.

With the background of the considerable experience which our company has had in this industry; with a new factory and improved manufacturing facilities which we now enjoy; and with our present affiliation as a division of Borg-Warner Corporation, a large group of highly successful manufacturing companies, we look forward to a much more rapid expansion of the Norge business from now on.

Howard E. Blood, President

Smith of Illinois

OUR experience during the past three months has indicated an increasing activity in electric refrigeration cabinet sales. Reports from our distributors indicate that unless there is a general slump in the building activity throughout the country, sales will be very satisfactory. Personally, I think the condition of the building industry does have and will always have a great deal more effect on the consumption of electric refrigeration than any stock market or other outside business activity. It is barely possible that there will be more money finding its way into bonds for the next year or two, instead of into the stock market, and if bonds are popular it is very apt to contribute to a free and general building program in the cities where there is a demand.

The principal changes in our program for 1930 are summed up in the words "standardization" and "simplification." We intend to limit our production to fewer sizes to fit standard makes of units. We intend to make only eight different sizes during the coming year, as far as cubic footage is concerned. There will be variations in the interior and exterior construction or material used, but we feel that the general market for household or apartment house refrigeration can be covered by six or eight sizes. At the present time, we feel that the question of suspension of freezing coils is one of the greatest drawbacks in electric refrigeration installation. So many different centers on bolts are needed; in fact, the same company may use three or four different center constructions or measurements for their suspension bolts. This requires extra expense, not only for the cabinet manufacturer in varying from standard, but also on the part of the electric unit manufacturer to provide adjustable suspension apparatus.

We anticipate a very satisfactory year for 1930.

F. L. Smith, Vice-President

Frigidaire Prepares for Larger Commercial Market

Warner of Warner

WE are pleased to report that our business has shown increase of about 275 per cent over corresponding period of year before.

So far as we can determine, the stock market has not appreciably affected our sales. Our distributors and dealers seem quite enthused about the prospects for 1930, and we are looking forward to greatly increased business in the next twelve months.

Feeling as we do, that the prospects for 1930 business are good, we are going to materially increase our merchandise and advertising program.

We believe that prospects are for greatly increased market, due to the fact that the public has generally accepted electric refrigeration as the most practical and economical means of securing better refrigerating results.

We are well pleased with our product as now is, and do not contemplate any changes in the design of our equipment. We are, however, now making plans to speed up production.

Our export department reports good prospects for increased volume of business during the coming year.

E. L. Warner, Secretary

Additional Statements from refrigeration executives may be found on Pages 2 and 8.

ALL ELECTRICAL PRODUCTS SHOW 34% GAIN

By Gerard Swope, President General Electric Company

THE progress in the electrical manufacturing industry during 1929 has been very satisfactory in every direction. A new record of sales was established, the increase over 1928 being approximately 34 per cent There has been a very substantial increase in the use of electric current in the homes and in every field of human endeavor It is remarkable how this increase continues from year to year.

Distinct progress has been made in the initiation of plans for the electrification of railroads, and we look forward to still greater development in this direction in the near future. Developments in electric appliances are proceeding at a rapid rate, and new uses are constantly being found for electricity, which constantly widens the field of the electrical manufacturer.

With this expansion and development in the industry, we look with confidence to a satisfactory business throughout 1930, with adequate earnings and steady employment of labor.

Crosley of Crosley

OUR product, the Crosley Icyball Refrigerator, was designed primarily to serve a field not taken care of by the electric or other automatic refrigerators. It brings refrigeration to homes in places where ice cannot be purchased and where electricity is not available.

While a ready reception has been found for our unit, we have not attempted to make every possible sale during the past year. It has been our policy, rather, to build sales conservatively by obtaining a reasonable number of satisfied users.

Our export trade has been particularly favorable. The device has been patented and introduced in all of the larger foreign markets. We believe that shipments to these countries will be at least doubled during the coming year.

While our activities so far have been limited to the sale of our non-automatic unit, we have no reason to believe that all types of units will not enjoy satisfactory sales throughout 1930.

The desire for household refrigeration is well established in the minds of the majority of people, and during the next twelve months assemblies that are reasonably low in price and free from service difficulties should enjoy a ready sale.

L. M. Crosley, Vice-President

THIS is a Continental type of pastry refrigerator for chilling moulded desserts, cream cakes, etc. Notice the box-like doors, affording heavy insulation. The cabinet has been electrified by a vertical fin coil placed in the top, and the cold regulator is set at 40 degrees on account of the gelatine substances which must be hardened and the whipped cream garniture which must be "held up." The compressor is placed just to the left.

Weissenburger of Keokuk

NINETEEN-TWENTY-NINE was the best year the Keokuk Refrigerating Company has enjoyed since its organization in 1921. The new small direct - connected Keokuk compressor brought out early this year met with a very favorable reception, and many new dealers were added to our organization.

Sales during the last three months of 1929 were 55 per cent in excess of those for the same period a year ago, although a much greater percentage of these were time-payment sales. The recent stock market break undoubtedly had a dampening effect on electric refrigeration sales, which was particularly noticeable during the Christmas season.

In regard to the outlook for 1930, Keokuk dealers seem very enthusiastic, and we expect a considerable increase in our business. This will be backed by a more extensive program in both merchandising and advertising. We find that the number of interested prospects is steadily being increased, this increase being in direct proportion to the number of new users of electric refrigerators. These satisfied owners are, in our opinion, the greatest single factor in the increase of public acceptance of electric refrigeration and of sales possibilities for our product.

One of the outstanding events of the year 1929 in our industry was the recent unpleasantness occasioned by undue publicity given to deaths allegedly due to refrigerant gases. The harmful effects of this publicity were unquestionably great, but on the other hand it forced a better spirit of co-operation on the industry, brought about some very essential legislation, and caused the elimination of some types of installation which could not be other than harmful to electric refrigeration in general, as well as those concerned with the installations.

Keokuk electric refrigerators for 1930 will not vary greatly in design from those produced in the past. There will be some additions, however, to that part of our line adapted to small commercial requirements, as well as several slight modifications and improvements made with a view to increasing efficiency and decreasing possibilities for the necessity of service.

The Keokuk Refrigerating Company has observed the work and growth of the ELECTRIC REFRIGERATION NEWS with considerable enthusiasm, and we take this opportunity to express our appreciation of your accomplishments and wish your paper the best of success in the future.

G. E. Weissenburger, President

McCord of Hussmann

OUR business has shown a substantial increase for the past three months over the corresponding months last year. Undoubtedly the stock market break affected our business somewhat, although it was not appreciably felt by us.

2. From reports received from our distributors and dealers, we are preparing for a very marked increase in our business for the year 1930.

3. Our general merchandising and advertising program will be much more extensive in 1930 than ever before.

4. The market for refrigeration has been broadening for the past two or three years, and from all indications will be much larger the coming year. I believe food merchants generally have recognized the necessity for refrigerated equipment for the proper preservation and display of all food products—in fact, this to a very large extent has been forced upon them by public demand.

5. I feel there is much closer cooperation and certainly very much better understanding between manufacturers of commercial refrigerators and manufacturers of refrigerating units than ever before, which, of course, reacts to the benefit not only the manufacturers, but customers as well.

6. We do not contemplate any radical changes in the design of our products during the coming year; however, our engineering and research departments are constantly working to improve the construction and general efficiency of our products to meet with requirements of the various markets.

7. There is a slow increase in the demand for refrigeration in foreign fields, which will take several years to become a material factor. Our entire organization is very optimistic in regard to 1930, as to the possibilities of business generally.

D. C. McCord, Vice-President

SERVEL

CREATES A COMPLETE REFRIGERATION BUSINESS FOR WHOLESALE AND RETAIL OUTLETS—UPON A NEW BASIS WHICH ASSURES INCREASED SALES AND PROFITS IN EVERY TERRITORY THROUGHOUT

1930

EACH Servel sales outlet is able to meet effectively and economically every conceivable refrigeration requirement—with the two great Servel Series . . . Domestic and Commercial.

New sales policies for 1930 provide important selling advantages . . . make each Servel franchise more valuable than ever. These advantages are new list prices which offer greater value per dollar, discounts adjusted to insure a permanent and profitable business . . . plus a COMPREHENSIVE PROGRAM OF POWERFUL FIELD ASSISTANCE through every angle of local sales work.

Servel is aggressively expanding and cultivating each local market to the fullest possible extent. Educational campaigns have been prepared to develop thousands of new refrigeration prospects. Detailed plans are now complete so that each of these prospects can be followed up rapidly and profitably. Highly trained and capable field men are ready to co-operate in every type of sales effort.

A new co-operative program of intensive local advertising, described as the most generous in the industry, is ready for operation.

Men with the ability to establish and maintain a complete refrigeration business . . . wholesale or retail . . . will find that the Servel franchise offers the greatest profit opportunities in this rapidly growing industry.

If you are prepared to take the fullest advantage of the opportunities Servel presents, write us inquiring whether your territory is still available. We will send you information on the 1930 Sales Program.

SERVEL SALES, INC.

EVANSVILLE, INDIANA

DOMESTIC

The famous K-line of domestic models in 5, 7, and 10 cubic foot food capacities has been tested and approved in thousands of kitchens. It has not been marred by novelties or innovations.

But it has been augmented by the new JS-4, with four cubic feet of food capacity . . . a leader, priced to secure instantaneous acceptance in every city and town.

This new Servel has the same expertly engineered system of refrigeration in a cabinet especially designed by Seeger.

The Servel Domestic Series because of its excellence in every detail of design and construction has earned a nation-wide acceptance.

Women know and appreciate the dependability, convenience, noiselessness, quick-freezing power, and beauty of these splendid refrigerators.

Domestic Chilling Units for Multiple Installations

Every type of domestic refrigerating service can be provided effectively and economically by Servel.

For multiple installations in apartment houses and elsewhere, there is a complete series of Chilling Units including 11 separate models, adaptable to every possible need.

COMMERCIAL

The Servel Commercial Series . . . already the outstanding line in this highly profitable field . . . is the most complete and most flexible ever presented.

Freezing capacities ranging from 75 to 1200 pounds ice melting equivalent make it possible to serve any commercial use, with either air or water cooled units.

An Almost Unlimited Market

So far the tremendous market for commercial refrigeration has hardly been touched.

Meat markets, groceries, restaurants, clubs, hotels, florists, confectioners, drug stores, soda fountains, dairies and dairy farms and a dozen more, all need Servel refrigeration.

The proved operating economy of Servel assures a considerable saving that no business man can afford to overlook. The absolute dependability of Servel provides a clinching argument that closes sales.

No Costly Complications

Servel commercial business is profitable because it is so easy to handle. Any salesman can learn how to figure a job quickly and correctly. And parts are so light one man can erect all ordinary jobs.

Aggressive sales work in this great field brings a prompt and profitable return.

Commercial Chilling Sections

A series of commercial chilling sections in assorted sizes and proportions and designs cares for any type of cooler, refrigerator or display case.

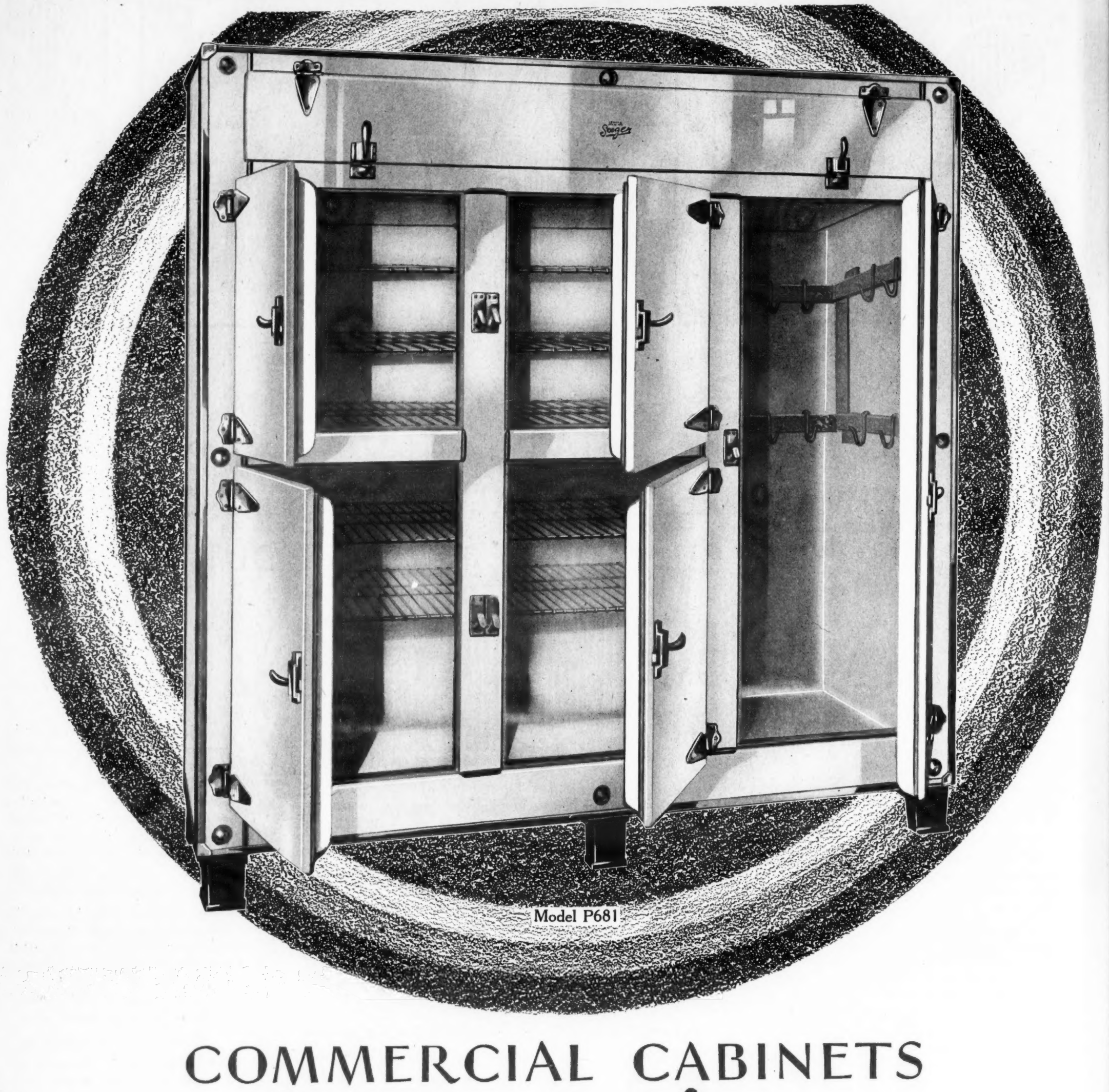
3 Popular Water Coolers

Every business office is a prospective purchaser of one of the handsome Servel Water Coolers . . . and the annual volume from this profitable business reaches a surprising total for those who put vigorous pressure behind them.

Ice-Cream Cabinets Bottle Coolers . . Dairy Coolers

Each of these three special markets will deliver a worth-while volume of sales. Servel sales outlets are prepared to serve them more effectively with models designed to meet every practical requirement.

Every ice-cream manufacturer is a prospect for a Servel cabinet. Every filling station, every roadside stand, every soft drink store is in the market for a Servel bottle cooler. And every dairy farm can effect tremendous annual savings with Servel refrigeration.



Model P681

COMMERCIAL CABINETS

By Seeger SAINT PAUL

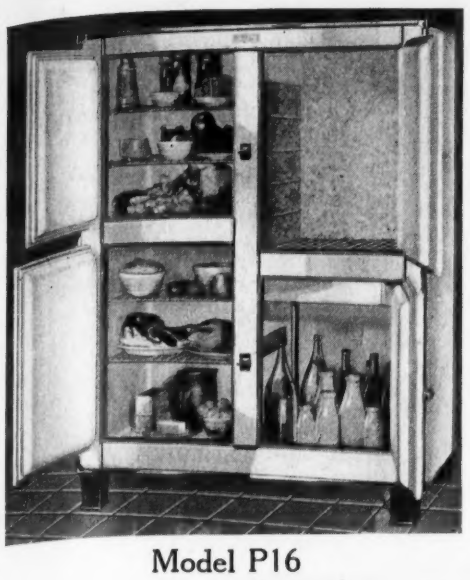
Announcing the New Line for 1930

Never before have we presented so many magnificent Cabinets—all of Seeger quality. These Cabinets are the ultimate in convenience, beauty, durability, efficiency and economy of maintenance. Sturdily constructed throughout, they will scientifically refrigerate food for many, many years.

Cabinets are shown with the Seeger originated overhead coil compartment for Electrical, Gas or Mechanical refrigeration. Others shown with bunkers may be used also with ice.

The Seeger Made to Order Department will solve any Refrigeration problem that cannot be taken care of with the stock Cabinets.

SEEGER REFRIGERATOR COMPANY
SAINT PAUL, MINNESOTA



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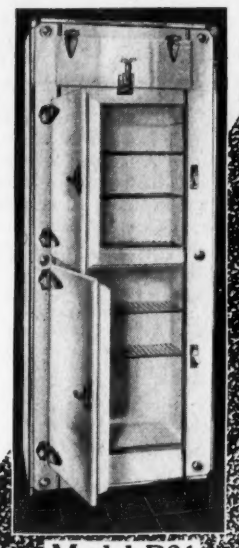

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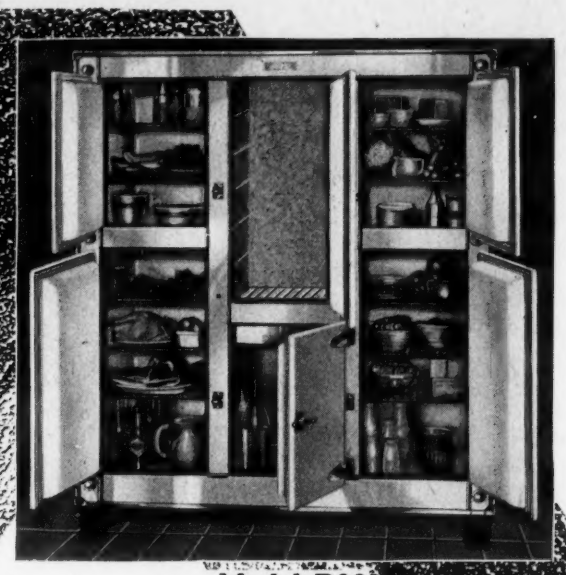

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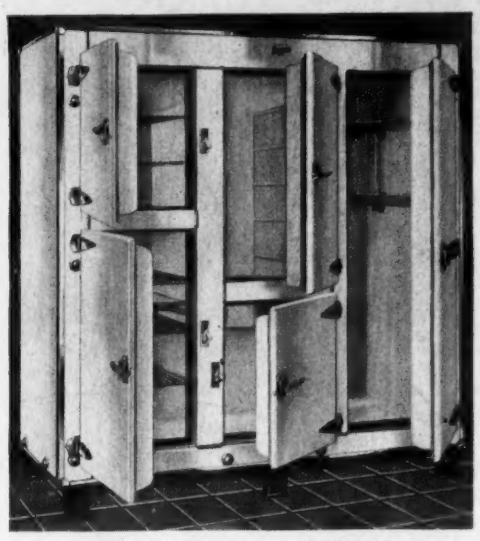
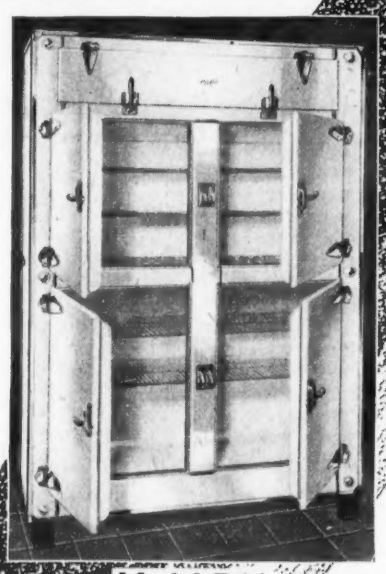


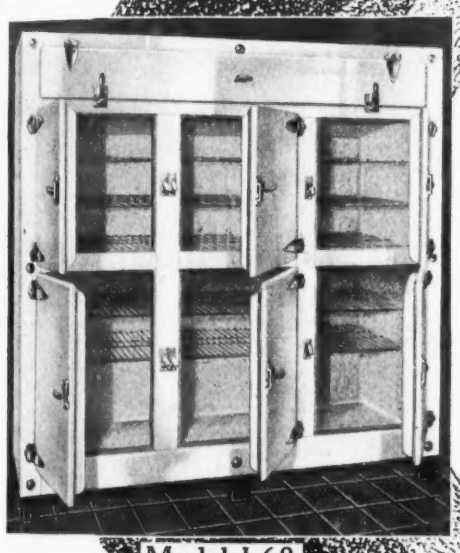
Model P431 and P491



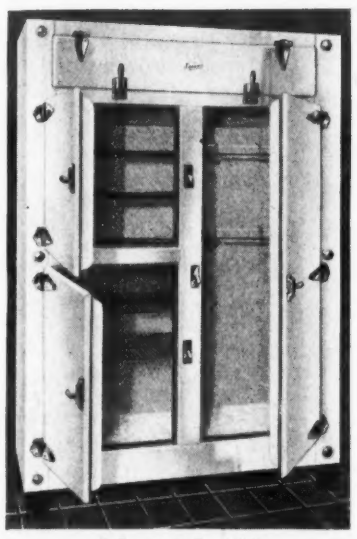
Model P44

Model P68

Model P43 and P49



Model L68



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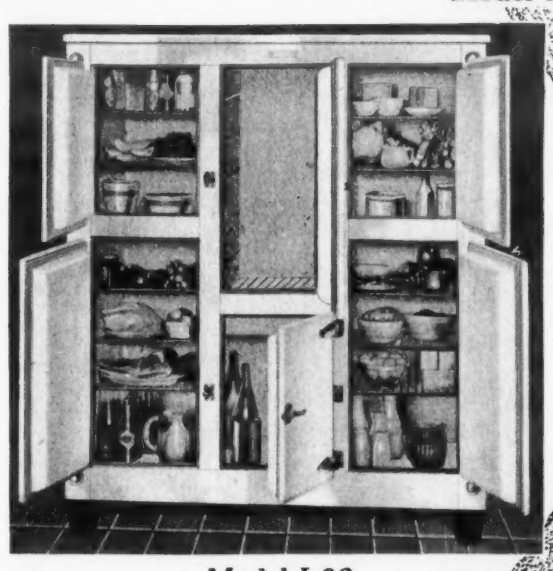

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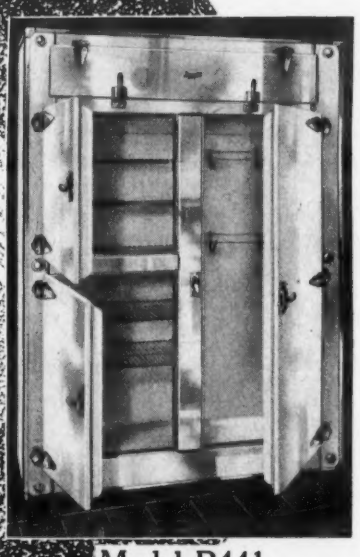

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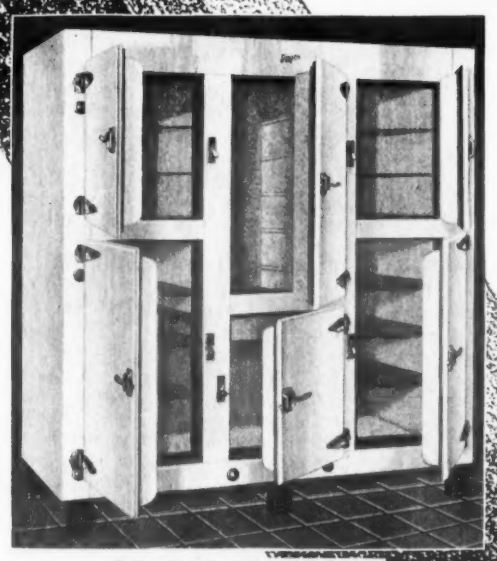

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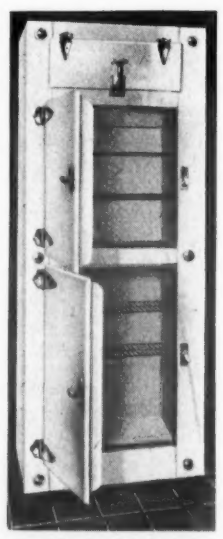
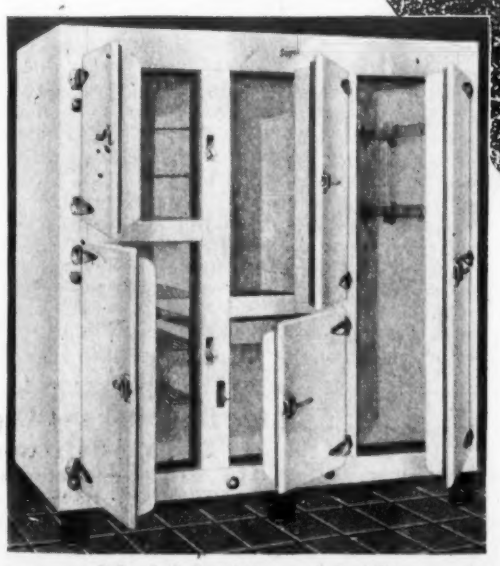


Model L21

Model L16

CABINETS BY Seeger SAINT PAUL



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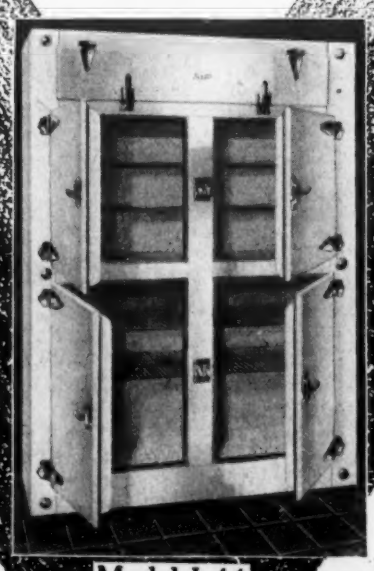

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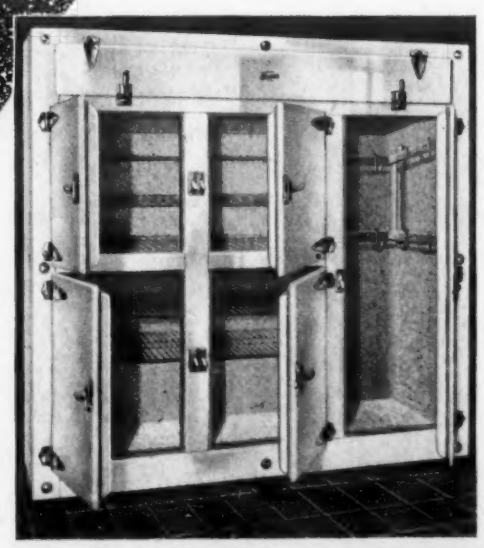


Model L681

How They Advertise In Belgium

Meyers of Rex

THE stock market break has undoubtedly retarded sales of electric refrigeration cabinets in the same way it has other items; however, in spite of the stock market situation our business during the past three months of this year shows an increase over the last three months of last year.

2. Without exception, practically all of our sales connections, including the manufacturer of refrigerating units and the distributors, are looking for a very healthy volume of business for 1930.

3. Both our general merchandising advertising programs will be more extensive for 1930 than for the year just closing.

4. The most significant trend indicating an enlarged market for refrigeration, in our opinion, is the fact that such concerns as Montgomery-Ward and Sears-Roebuck companies are contemplating the addition of electric refrigeration to their business. This is indicative of the fact that there is an ever-increasing demand for electric refrigeration or these two companies would not be interested in furthering their sale.

6. As we see the situation the greatest influence working toward the stabilization of the industry is the fact that companies with years of manufacturing and merchandising experience and companies with tremendous assets are interested in entering the electric refrigeration field. We also find that most of the manufacturers of the electric units are taking on a higher caliber of distributors. We see an ever-increasing number of high grade well financed distributors, and we all feel there is a tendency toward getting away from price cutting, which was very evident during the last two years.

7. There will be no change in the production or distribution methods insofar as our company is concerned for 1930. Neither will there be any essential changes in the design of our product, but of course the new 1930 line of cabinets will embody a number of important revisions and improvements in keeping with the trend in cabinet design.

8. We are receiving an increased number of inquiries from foreign sources. We are also receiving quite a number of export orders and there is no doubt but that the export field for electric refrigeration is growing steadily year by year.

Edgar Myers, Sales Manager

Jaeger of Leonard

OUR business has not shown a substantial increase during the past three months over the corresponding period of 1928. We do not believe that the stock market "break" has appreciably affected sales, although it is holding back the placing of some jobbers' and dealers' requirements.

2. An increase for 1930 is reflected in the latest reports from our salesmen, distributors and dealers. However, there will be more "hand-to-mouth" buying, in other words, the retailer will place his orders for delivery as near as possible to the time of sale.

3. Our national advertising program will be the largest ever conducted by any manufacturer of cabinets for ice or electric refrigeration. It will consist of spreads in color, color pages, and black and white pages in leading general and women's magazines. Our merchandising activities contain many new phases, including "Leonard Awards" for outstanding merchandising achievements, the organization of the "Leonard Merchandising Exchange" for the selection and distribution of good resale plans as well as sales manuals for retail clerk education and improved dealer display material.

4. Educational refrigeration articles in national magazines, studies in public schools, talks before mothers' clubs and Parent-Teachers organizations, the National Food Preservation Program, have all educated American housewives to the vital necessity of year-round refrigeration and food preservation, with particular reference to the health of the family. These factors, we believe, definitely indicate an enlarged market for refrigeration of all types.

5. The writer is not as conversant with the facts required to answer question No. 5 as he might be; however, would say that the promotion and successful operation of the September, 1929, National Food Preservation Program, being fully co-operative, both from the standpoint of thought, effort, and money involved, and taking into consideration the ice industry and the ice refrigeration industry, has developed better understanding and a co-operative spirit.

6. We have nothing in particular to report in answer to the sixth question.

7. Leonard is discontinuing completely the manufacture of wood and non-insulated household refrigerator cabinets. Our 1930 line is composed of all-steel, all-modern, all-performance refrigerators. The models will contain convenience features like an automatic, self-opening door, and food-safety signal (gauge on outside of box, showing when temperatures are right). A range of colors matching kitchen decorative combinations will be offered.

8. We are not fully in touch with the export situation, as all of our export sales are handled by the export division of the Kelvinator Corporation. However, we understand from their foreign representatives, who visited us in Grand Rapids some months ago, that it more nearly meets the demand of foreign trade than anything we have offered heretofore.

A. H. Jaeger, First Vice-President

Matthews of Electro-Kold

ELECTRO-KOLD sales in the past three months show considerable increase over the corresponding three months of last year. This amounts to approximately 15 per cent. However, the stock market reaction has injured our rate of increase, as it would have been in excess of this but for this reason. We do not look for as adverse effect on Pacific Coast conditions due to this influence as elsewhere in the United States. West Coast industries and natural resources are quite independent from Eastern influences, and this will make for a better business year on the Pacific Coast than we look for elsewhere in the country.

2. The opinion that 1930 will be a normal year is reflected in the statements from most of our dealer organizations, who look for a normal year. Building projects now under way seem to be normal or better, and department store trade during the holidays held up exceptionally well.

3. Electro-Kold merchandising activities will be confined to the Pacific Coast states, as formerly, together with our export volume in South American and Oriental countries. We are laying our plans for a 30 per cent increase in 1930, which will call for increased merchandising and advertising appropriations.

4. The major trend of developments, indicating a large market for refrigeration in 1930 come chiefly from the household end. The commercial and apartment ends of electric refrigeration are well established, and refrigeration is being installed wherever the need and ability to buy are present. In the household field there has been so much advertising and user propaganda that increases in this end of the business will be very rapid each succeeding year.

5. The National Food Preservation Program was one of the largest co-operative movements in the industry in 1929. It seems that many worthy co-operative movements can gain support among the electric refrigerator manufacturers, but it is very difficult to organize the electric refrigerator dealers. Manufacturers' list prices are very close, but dealer prices vary widely. The one big contributing cause why a great many electric refrigerator dealers did not show a profit in 1929 has been due to low selling prices on their part, and all manufacturers could do much in this field towards stabilizing retail prices rather than factory list prices alone. This is being accomplished by dealers who are operating on too small a margin, due to cutting their retail prices, gradually passing out of the picture, and this is a particularly harsh method of bringing out this desired end.

This also answers No. 6.

7. Changes in the design of Electro-Kold mechanically in 1930 will be in the way of refinements on commercial and apartment units. Apartment frost units have been simplified and a removable slide effected for ice tray compartments, so that a double depth compartment can be used even on apartment house units. Several new commercial coils will be added to the Electro-Kold line, and in the household field we will have a complete new series of household cabinets marked by added refinements in finish, hardware, shelf area, ice cube capacity, etc.

8. We have noted a very marked increase in the export business in 1929, and look for much increased buying in this field for the coming year. All in all, we anticipate a perfectly normal year, with moderate increases for 1930, and are laying our program accordingly.

E. S. Matthews, Sales Manager

Here's Why

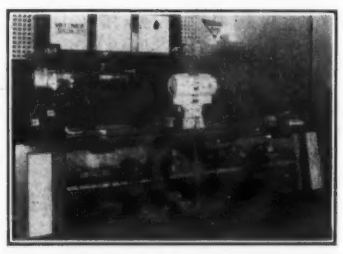
KELVINATOR

Dealers Make Money!

A Tremendous Market for their Product

In addition to the countless thousands of homes that are all prospects for Kelvinator Domestic Refrigeration, there is a rich market for commercial refrigeration equipment—and Kelvinator dealers hold an enviable position in this field.

Meat markets are entirely dependent upon efficient refrigeration to prevent spoilage losses. Kelvinator's advantages are so obvious and outstanding in eliminating these losses—as well as in keeping meats in the finest condition—that meat merchants are eagerly welcoming this sounder method of refrigeration.

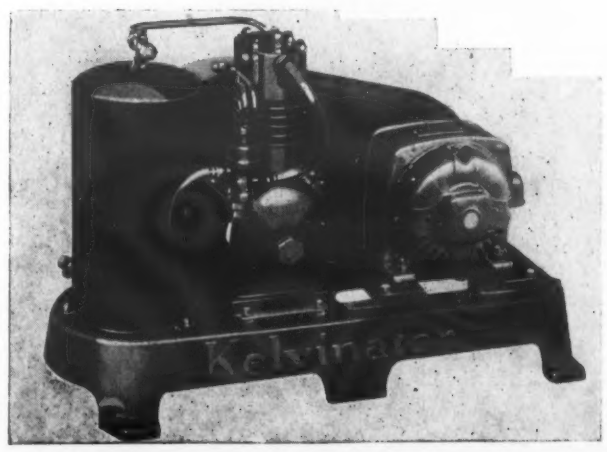


Kelvinator brings to grocers a new opportunity for increased profits. With Kelvinator refrigeration, all of the perishables that an up-to-date grocer must handle are kept in perfect condition until sold. Spoilage losses are practically ended. Operating costs are reduced. More sanitary conditions, and cleaner, fresher foods invariably mean more business for the grocer. Kelvinator equipment is available for every grocery need.

The modern restaurant needs reliable refrigeration for storing perishable meats and vegetables, for chilling salad pans, for cooling drinking water, etc. Kelvinator dealers can show figures here, too, that will make any restaurant owner conscious of Kelvinator's advantages. Hotels, clubs, restaurants, cafeterias, coffee shops and tea rooms all need Kelvinator.

All florists are Kelvinator prospects, for Kelvinator refrigeration has proved its economy and efficiency in keeping flowers fresher, and for far longer periods than old-time methods. Kelvinator makes possible such savings that its cost is soon repaid. There are facts and figures that prove that no florist can afford to be without Kelvinator refrigeration.

Kelvinator Giant Model X5-140 Cross-Fin Coil Cooling Unit. 66 in. long, triple section type. CAPACITY EQUIVALENT TO 105 TONS OF ICE PER YEAR



Model WR-20. 3-4 h. p. Water-Cooled Unit with water-cooled compressor head. Normal capacity 1-2 ton ice melting per 24 hours' operation.

An Unsurpassed Product for their Market

It is because the Kelvinator dealer has available so comprehensive and complete a line of commercial equipment that Kelvinator leads the commercial electric refrigeration field. Kelvinator manufactures cooling units in such a wide range of types and sizes that the Kelvinator dealer can equip each and every installation with the most efficient and economical unit that can be had. To handle the very largest refrigerator boxes the Kelvinator dealer has the Giant Cross Fin Cooling Units—one of the finest pieces of equipment known to the industry.

The Kelvinator Condensing units range in size from 1-6 h.p. to 1 1-2 h.p.—the larger sizes available both air and water cooled. This complete range of compressors makes possible a first-class, efficient installation for every size restaurant, grocery, meat market and florist shop.

Thousands of dealers have found the Kelvinator Franchise without a parallel in the refrigeration industry. However, there are still several territories where Kelvinator is not represented. If you are interested, write or wire for additional information.

Watch Kelvinator in 1930

KELVINATOR SALES CORPORATION, DETROIT, MICH.

KELVINATOR OF CANADA, LIMITED, LONDON, ONT. KELVINATOR, LIMITED, LONDON, ENGLAND

FOOD PRESERVATION IS FAVORITE ALLY OF BALANCED DIET

By Jack Wooten

VEGETABLES and fruits from rural districts and small garden plots containing large amounts of iodine were utilized by the Columbia, S. C., Food Preservation Council in its exhibition which emphasized the need of preservation and conservation of certain foods in the home. During recent months there has been discovered in South Carolina garden products large amounts of iodine, which, it is said, is a preventive of goiter and other ailments. Special effort is being made to push the products of that state and interest in gardening has been on the increase.

The Columbia Council, which consisted of the Broad River Power Co., Frigidaire Corp., Weir Electric Co., and City Ice Co., capitalized on this ever-growing interest by making the September drive tie-in with the spring, summer and fall garden idea. Products from each of the three gardens were displayed at the exhibition, and instructions were given on how to preserve and conserve certain products by food preservation. Charts showed the necessary diets for each season, and many people who attended the show carried away with them printed copies of the information contained on the chart under which the fruits and vegetables had been placed.

To make the campaign of civic interest, the local council approached the Supervisor of the Columbia playgrounds, who consented to assume the responsibility of putting the program across. The initial move of the Supe.visor was to get the support of the following organizations:

Richland County Council of Farm Women.
Richland County Federation of Women's Clubs.
Columbia Women's Club.
Columbia Children's Clinic.
Pacific Mills Clinic.
Business of Professional Women.
American Red Cross.
Social Working Club.
City Playground Department.
Central Council of Parents and Teachers.

After the Women's Club was organized and its various committees appointed, it was decided to put on the food show, connecting up the value of iodine content vegetables with safeguarding the health through proper refrigeration. Representatives of the various clubs co-operated in the movement and acted as hostesses at the food show each day. One morning of the food show was given over to a canning demonstration.

The members of the clubs were so actively interested in the show that they decided to advocate permaennt courses in food preservation and to urge organizations to carry forth the idea of proper year around refrigeration for safeguarding the health of people in their community.

About $700 was raised by the Columbia council to put the 50-degree drive over. In order to take care of the demands created through the national advertising, 1,000 contest booklets and 500 thermometers were ordered. Most of the fund was spent for newspaper advertising, the council running five ads in each of the two Columbia papers. In addition, each of the companies co-operating in the movement ran individual ads which carried the message of food preservation.

As soon as the food show was completed at the Chamber of Commerce, the council moved the display to the Children's Clinic, later to one of the cotton mill districts, and finally to the state fair, which attracts thousands of people every year to Columbia.

Elaborated Essays Prepared by Prize Seekers in Food Preservation Contest

HERE are some of the freak entries in the essay contest of the National Food Preservation Program. In the foreground, the young woman at Contest Headquarters is shown holding a cardboard refrigerator. When the doors were opened, pictures of foodstuffs were shown The essay of the contestant was enclosed. Another entrant sent in the small house shown in the background. It consisted of three kitchens, in one of which windowsill refrigeration was used, in another a refrigerator placed so near the stove that it would not operate efficiently, and a third showing the proper method. Of course there was an essay with it, too.

WESTINGHOUSE UNIT HAS MAGNETIC FAN

(Continued from Page 1. Column 4)

the Westinghouse refrigerator, embodies a motor-compressor unit, fan, condenser and control mounted on a base, with the evaporator hung from a steel tube or tubes, mounted on the underside of the base; the whole being a unit, that is, independent of the cabinet, it is interchangeable in certain sizes of cabinets.

After choosing a type of refrigerating machine construction that insured factory control of the final product, it was necessary to design the various component parts of the machine so that the maximum of reliability was achieved. Recognizing that a fruitful source of trouble lay in the shaft seals, belts, brushes and commutators of the conventional machine, it was decided to eliminate all of these.

The elimination of the shaft seal points to a hermetically sealed unit with the motor and compressor in the same case. Belts might be eliminated by the substitution of gears, but gears are costly, tend to be noisy, and add nothing to the final product if in their place is substituted a carefully designed direct connected compressor.

Brushes and commutators can be eliminated by using a split phase motor if some provision is made for allowing the motor to start under light load.

All of the above ideas were incorporated into the Westinghouse refrigerating unit. It employs a reciprocating compressor with its crank pin an integral part of the forged alloy steel motor shaft. This motor is a split phase AC motor. The whole is enclosed in an hermetically sealed case, along with the refrigerant sulphur dioxide. The method of allowing the motor to start under a light load will be taken up later.

Besides bringing the elimination of the potential sources of trouble enumerated above, sealing the mechanism in a gas tight case insures that no dirt or moisture can enter from the outside, and that the oil and refrigerant supply will remain in its original condition and amount.

Westinghouse has chosen the above construction in order that its machine will be reliable and arrive in the purchaser's home in its factory-tested condition. The general features mentioned are the most important in achieving these conditions. A mechanism might be reliable so far as its general nature was concerned, but if in constructing the details care was not exercised, the good work already done would be completely undone. Reliability has been further achieved by reducing the moving parts to as small a number as is practical, and at the same time making them rugged. For the purpose of reducing the number of parts, only one trunk type piston is used, a piston and connecting rod construction that has adequately proved its worth in the automotive line.

Lubrication is accomplished by bathing all of the moving parts in a powerful spray of cool oil.

Along the path of the refrigerant, wherever practical, separable joints have been eliminated, and in their place soldered or welded joints substituted.

Oftentimes, it is the case that one desirable characteristic is obtained only at the expense of others. Peculiarly enough, the adapting of the unit type structure and the hermetically sealed construction far from introducing undesirable characteristics has introduced several definite advantages. The unit type structure is most practically worked out with the compressor on top. This is advantageous, as the warm air given off by the condenser instead of rising up along the cabinet as in the conventional construction, rises up above the cabinet and thus does not tend to decrease the thermal efficiency of the cabinet. This unit type structure further makes a very nice service proposition, for in case of trouble it may be easily removed from the cabinet and easily replaced when necessary. Furthermore, as one refrigerating unit will fit several cabinets, it is possible for a dealer to stock less units than cabinets, if desirable.

The hermetically-sealed unit brings with it the elimination of many frictional losses. Prime among these is the friction losses of the shaft seal. Also, it is easily possible to eliminate several bearings, as the motor and compressor can use one shaft in common. This one shaft and one bearing replace two shafts and four bearings in conventional construction.

A problem that presents itself in connection with the hermetically-sealed construction, is that of cooling the condenser; in other words, of carrying off the heat that has been extracted from the cabinet and the heat given off incidental to the operation of the machine.

Convention dictates two methods of attacking this problem: one is by using a separate fan motor drawing air over a small condenser, and the other is to use a large condenser and allow natural convection currents to remove the heat. Both of these methods have their disadvantages. Westinghouse has developed a unique method of accomplishing

(Concluded on Page 26, Column 3)

Iodine Gardens and Electric Refrigeration Are Features of 50 Degree Campaign at Columbia, South Carolina

NOW . . .

every household Frigidaire inside and out is . . .

Porcelain-on-steel

and equipped with the "COLD CONTROL"

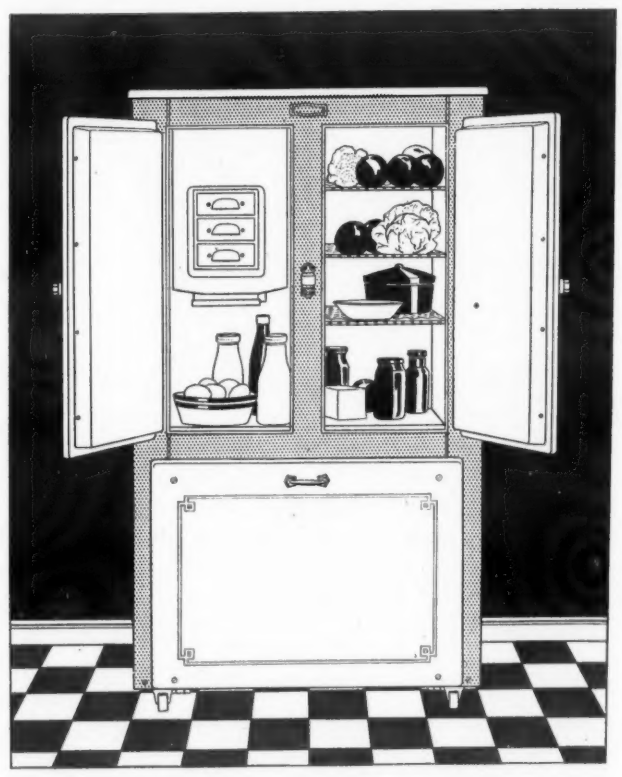
EVERY Frigidaire household cabinet—even the smallest model—is now Porcelain-on-steel—inside and out. Rust-proof Porcelain-on-steel with smooth, lustrous surfaces as easy to clean as chinaware.

A finish of greater beauty

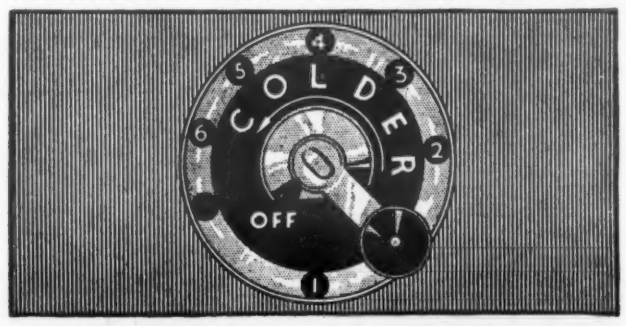
The Frigidaire Porcelain-on-steel adds striking beauty to the Frigidaire cabinets—beauty of Tu-Tone color for outside surfaces—beauty of sparkling white within. And it is a finish that will keep its beauty. It is fused on steel by special Frigidaire methods in the Frigidaire porcelain enameling plant—the largest plant of its kind in the world.

Added features—added value

In addition to being finished in Porcelain-on-steel, every household Frigidaire is also equipped with the famous "Cold Control" which speeds the freezing of ice cubes, salads and desserts. And every model has the extra power that insures better refrigeration. All have patented self-sealing ice trays that permit the freezing compartment to be kept intensely cold. All are incredibly quiet.



THE FAMOUS "FRIGIDAIRE COLD CONTROL"



Six Freezing Speeds at the Turn of a Lever

Unusual opportunity for dealers

The outstanding value and unusual features of Frigidaire have resulted in sales far in excess of a million—more than all other electric refrigerators combined.

To meet the steadily increasing demand for Frigidaire a few more dealers are being appointed. If you are qualified to represent us you will find our proposition one of the most interesting ever offered on any household appliance. Write for complete information.

FRIGIDAIRE CORPORATION
Subsidiary of General Motors Corporation
Dept. T-72 Dayton, Ohio

Frigidaire Corporation,
Dept. T-72, Dayton, Ohio.
If you have an opening for a Frigidaire dealer in this community, please send me complete information.

Name.....

Address.....

FRIGIDAIRE

Electric Refrigerators for Homes, Stores and Public Institutions . . . Electric Water Coolers for Homes, Stores, Offices and Factories . . . Ice Cream Cabinets . . . Milk Cooling Equipment . . . Room Coolers

REFRIGERATION AISLE DRAWS CROWDS AT PHILADELPHIA SHOW

Philadelphia, Pa.—The Electric and Radio Show which closed recently was held in the Commercial Museum under the auspices of the Electric Club of Philadelphia. A total of 350 companies exhibited products which included the whole range of domestic electrical appliances.

Many radio and electrical novelties were shown, although no "stunts" or other publicity measures were necessary to attract the crowds. It is estimated that the business done by the exhibitors ran over one million dollars.

In the "Electric Refrigerator Aisle" a number of companies were represented and their latest models attractively displayed.

J. J. Pocock, a member of the managing committee of the exhibition, had seven household Frigidaires and one bottle cooler in his booth. The household line ranged from the AP-4 to the AP-18. A Frigidaire compressor and evaporating unit were shown in operation.

General Refrigeration Corporation displayed a Spears ice generator operated by a No. 50 Lipman machine. Five other Lipman machines were shown, as well as a number of representative ammonia fittings.

A great deal of interest was shown in the new Kelvinator line. The D-22 model for freezing 200 pounds of ice per day and equipped with the new Ice-O-Thermic Tubes was the largest of the eleven Kelvinator models on display.

Welshbach Company booth contained a "super freezer coil" operating in a glass case and equipped with a No. S-30 condensing unit. An Ebco water cooler with a Welsbach unit and a number of household boxes completed the Welsbach exhibit.

A complete line of domestic General Electric refrigerators was shown by Judson C. Burns, with a C-450 commercial refrigerator and a DB-1 water cooler.

Servel-Electrolux was represented with a booth containing six models. The combination range and Electrolux refrigerator was displayed together with an open Electrolux unit operated by a tiny gas flame.

The Philadelphia distributor of Norge displayed Norge compressors in operation. Many of the Norge domestic cabinets were also displayed.

Merchant and Evans Company, a Philadelphia concern manufacturing electric refrigerators, completed the list of refrigeration concerns represented in the show. A prominent part of this display was the No. 275 commercial unit in operation.

SPRINGFIELD FRIGIDAIRE BRANCH MOVES

Springfield, Mass.—Local branch of Frigidaire Sales Corp. has opened a showroom on the first floor of the recently completed State Building, West State St., near Main.

Decoration on the walls and ceiling of the new showroom are modernistic, with two-tone green as the principal color factor; silver, peach and apricot brighten the ensemble.

How the Idea of Electric Refrigeration Is Being Sold to the Public En Masse

SOUTHERN DISTRICT HEADS VISIT KELVINATOR PLANT

Detroit, Mich.—District Managers J. K. MacCarthy, of Raleigh, N. C., and C. D. Mitchell, of Charlotte, N. C., spent the first week in December visiting the Kelvinator plant, 14250 Plymouth Road.

Both were confident of big business in the southeastern section of the United States, where their activities are centered.

IOWA FURNITURE CO. NAMED G. E. DEALER

Des Moines, Iowa.—Davidson's Furniture Co. has been appointed as a retail dealer for General Electric refrigerators.

TWO SERVICE SHOPS OPEN IN DES MOINES

Des Moines, Iowa.—Two service shops for electric refrigerators have opened here recently, Munn & Cassidy, 910 W. Grand Ave., and Johnson Mfg. Co., 1107 Cherry St. Both concerns service all kinds of refrigerators.

TOLEDO FRIGIDAIRE SALES INCREASE 35% IN 1929

Toledo, Ohio—O. W. Gleason, sales manager of the Toledo district of E. H. Walker Co., Frigidaire distributor, announced Monday that sales in 1929 in the Toledo district will show an increase of 35 per cent over sales in 1928.

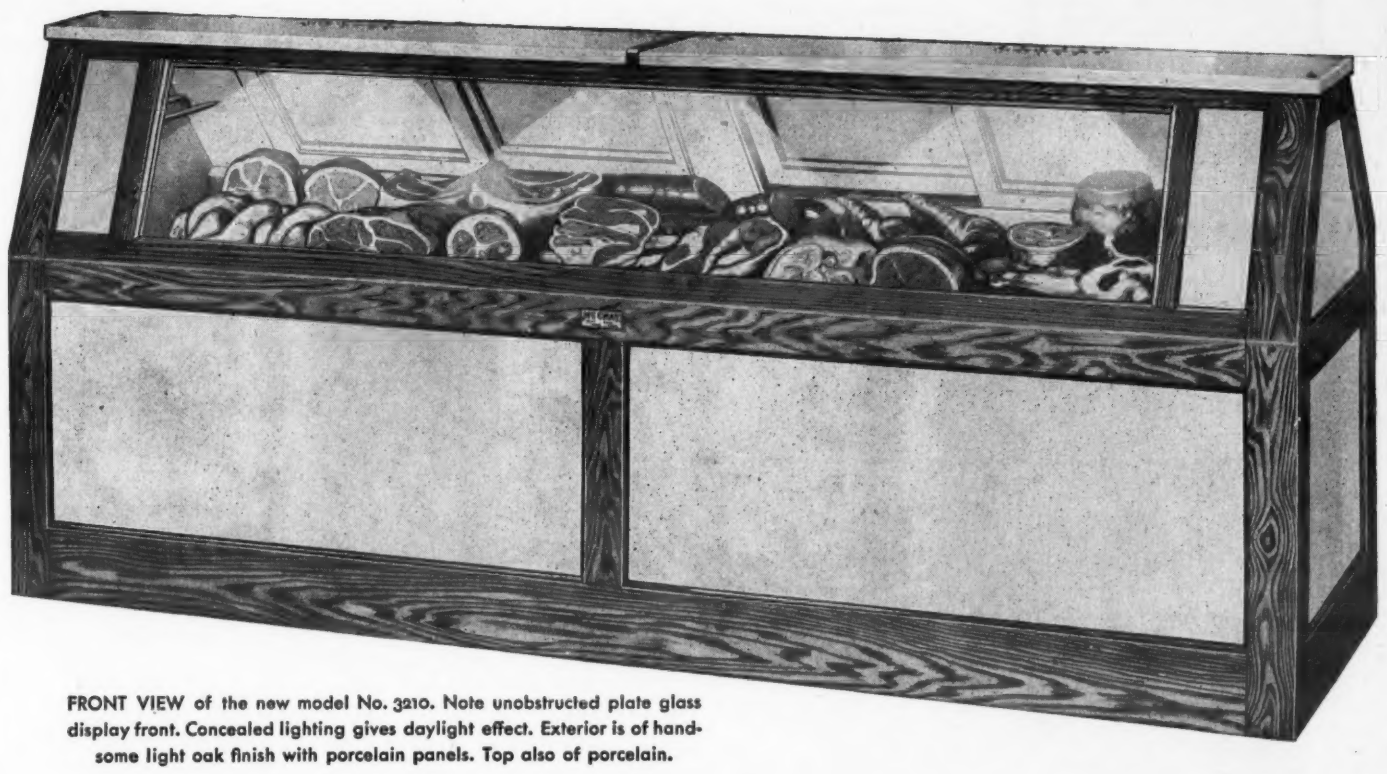
DISPLAY ▸▸▸ STORAGE REFRIGERATION in a New Unit by McCray

HERE is an entirely new creation by McCray—a refrigerator case that combines in one unit the advantages of attractive DISPLAY, with a generous amount of space for refrigerated STORAGE.

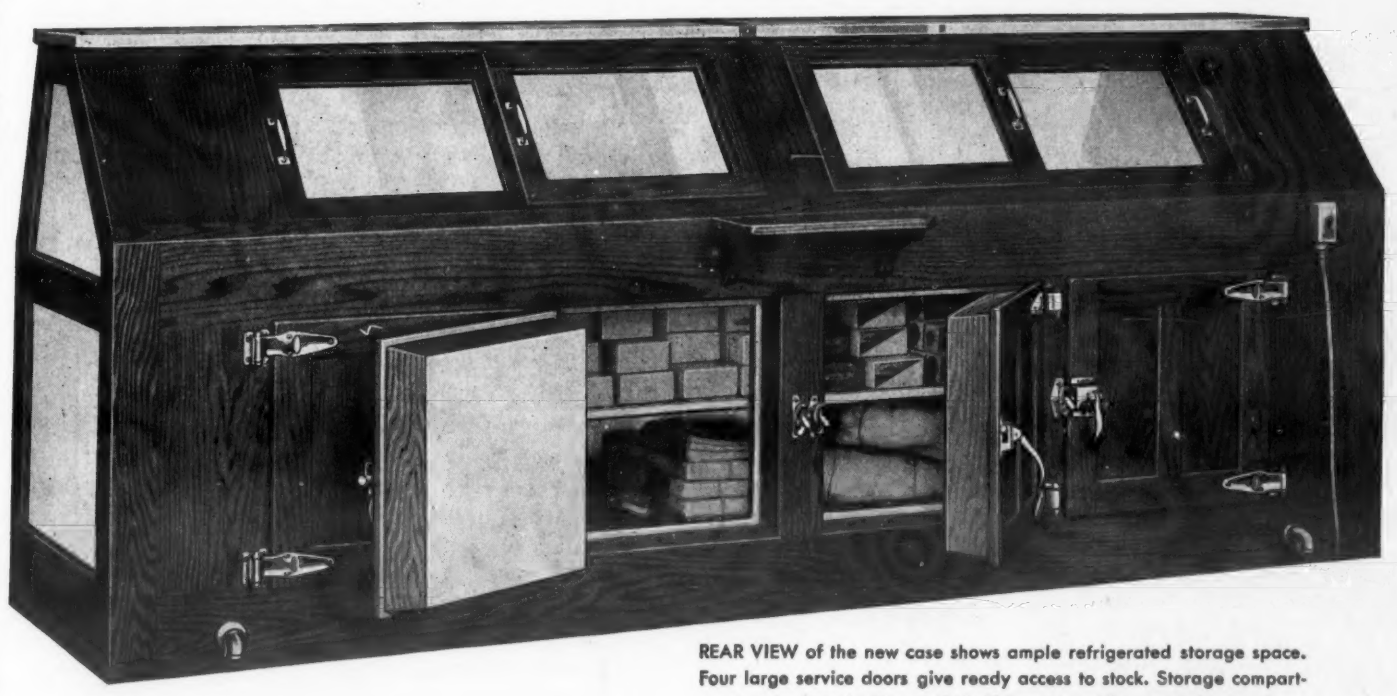
Designed to meet a real need, this new McCray model No. 3210 amply takes care of the requirements of food stores where limited room demands the greatest use of every foot of floor space. In the larger store this case serves adequately as an auxiliary to other equipment.

With a one piece display front of two courses of plate glass and FIFTEEN FEET OF DISPLAY SHELF SPACE, foods can be arranged with telling sales effect. Besides this, there is TWICE THAT AMOUNT OF STORAGE SPACE FOR RESERVE STOCK AND STAPLES. Quick access to this stock is obtained through four service doors in the rear.

And embodied in the new No. 3210 case is the well known McCray standard of construction; quality in every hidden detail which insures thorough, economical refrigeration with spoilage loss eliminated. Food merchants everywhere choose McCray equipment BECAUSE IT MEANS INCREASED SALES AND BIGGER PROFITS.



FRONT VIEW of the new model No. 3210. Note unobstructed plate glass display front. Concealed lighting gives daylight effect. Exterior is of handsome light oak finish with porcelain panels. Top also of porcelain.



REAR VIEW of the new case shows ample refrigerated storage space. Four large service doors give ready access to stock. Storage compartment equipped with wood shelf in center. Also wood floor rack.

For Use with Any Machine

THE McCRAY No. 3210 DISPLAY - STORAGE CASE is built for mechanical refrigeration only. As with all McCray models, any type machine can be immediately installed. No changes are necessary. In this unit, a coil space at each end provides for the cooling of the entire inner compartment. No partition separates the upper and lower sections. Pure corkboard insulation, sealed with hydrolene cement, keeps cold air in and warm air out.

WHATEVER TYPE MACHINE is used, the sterling in-built quality which has characterized the name McCray for 40 years, is a guarantee of the most satisfactory performance. This is of special interest to dealers in mechanical refrigeration as the right equipment is necessary for a successful installation.

McCRAY is the world's largest manufacturer of refrigerators for all purposes. Dealers in machine refrigeration should get the facts now regarding the McCray line. Write for catalogs. No obligation, of course.

McCRAY REFRIGERATOR SALES CORPORATION, Dept. 66, Kendallville, Indiana

SALESROOMS IN ALL PRINCIPAL CITIES (See Telephone Directory)

WORLD'S LARGEST MANUFACTURER OF REFRIGERATORS FOR ALL PURPOSES

McCRAY REFRIGERATORS

URGES INDUSTRY TO UNITE ON RESEARCH

"Ice and the Dangerous '50,'" is the title of a small booklet issued by George B. Bright Co., 2615 Twelfth St., Detroit, Mich., refrigerating engineers. A notation in the back of the booklet states that it is "published in the interest of a unified refrigeration industry."

After giving a short history of the growth of mechanical refrigeration, the booklet plunges into the unifying process with the statement that refrigeration, by sheer brazenness of youth, jazz and breezy advertising, has crashed the gates of public conservatism, and that the slogan, "Above 50 lies danger," was created solely as a sales promotional campaign under the guise of a national health movement.

The booklet continues, "We are still quoting 1910 two-cylinder refrigerator performance data and food preservation experience. Nowhere within knowledge, in the ice or ice refrigerator industry, is any true research being accomplished—to the shame and discredit (if not the discomfiture of both. Scattered 'testing' of a sort is being done here and there, but of a highly 'commercialized' nature. Regardless of the true merit of the 50-degree campaign, or the lack of all the facts on food preservation, the leaders of the ice and refrigerator industries have unnecessarily side-stepped and failed squarely to meet the issue. Regardless of implication, bluff, a little dangerous knowledge and experience, the real facts for the honest basing of opinion in matters of domestic food preservation are not at hand!"

The following charge is made against mechanical refrigeration: "Youthful automatic has done a smattering of study, test, and development, but in the throes of growing pains of mechanical perfection of detail he has been obliged to spend so much time on his mechanism as to have but scant time for intensive studies of results. He has been told the product of his genius has the disturbing faculty of drying out and shriveling his lady's foods, and with youthful confidence makes capital of his 'dry-refrigeration.' Few, if any, have had the time to stop production long enough to be more than passing curious as to whether this drying out was caused by 30 or 40 or 50 per cent or any other humid quality of the circulating air."

Ice industry is placated with the following: "Had a fraction of the time and money spent by the ice industry worrying over the possible inroads of mechanical refrigeration, and trying to prove to themselves and the public generally that these new-fangled contrivances were both too hazardous and expensive to consider—and on the other hand by the mechanical refrigerator industry trying to prove how utterly inadequate and obsolete ice refrigeration had become—been spent upon co-operative research on food preservation and educating the public to buy refrigeration rather than machinery or ice, a healthier respect would be felt for the entire refrigeration industry and its confidence reflected in the market value of its securities. The futility of trying to help one branch of the refrigerating industry by damning the other, is apparently as far from being understood as was the case ten years ago."

This statement is made in closing: "With the same co-operation in refrigeration as there is in the automobile industry, secured by a broad educational work founded on true research and authentic food preservation data, a unified educational work could be undertaken benefiting ice and mechanical refrigeration alike."

OIL-O-MATIC GIVES ANNUAL CHRISTMAS PARTY

Bloomington, Ill.—Six hundred employes of Williams Oil-O-Matic Heating Corp. and their families attended the concern's annual Christmas party. Work ceased at noon and the guests assembled at 3 p. m. to find Santa Claus and a big Christmas tree awaiting them.

The party was held in the administration building, which had been decorated throughout. Each employe was given a turkey by C. U. Williams, president, and Walter W. Williams, vice-president. Every guest received a box of candy. It was the largest Christmas party in the corporation's history.

FROZEN FOODS MEETING TO BE HELD BY ENGINEERS

Detroit, Mich.—A Frozen Foods meeting will be held at Hotel Statler, Monday, January 6, 1930, at 6:30 p. m., under the auspices of the Detroit Section of the American Society of Refrigerating Engineers. George B. Bright will be chairman.

Everything on the dinner menu, from soup to nuts, will have been frozen, and the entire program will be devoted to the subject of frozen foods. Women are urged to attend the meeting because frozen foods give promise of revolutionizing food distribution, a subject with which women are vitally concerned.

WELSBACH EQUIPS JOHNSON MEMORIAL HOSPITAL

Stafford Springs, Conn.—Johnson Memorial Hospital has been completely equipped with Welsbach commercial and domestic units. The installation was made by Willson Brothers, Thompsonville, Conn., who have also installed Welsbach units for a majority of the directors of the hospital board for use in their own homes.

CORRECTION

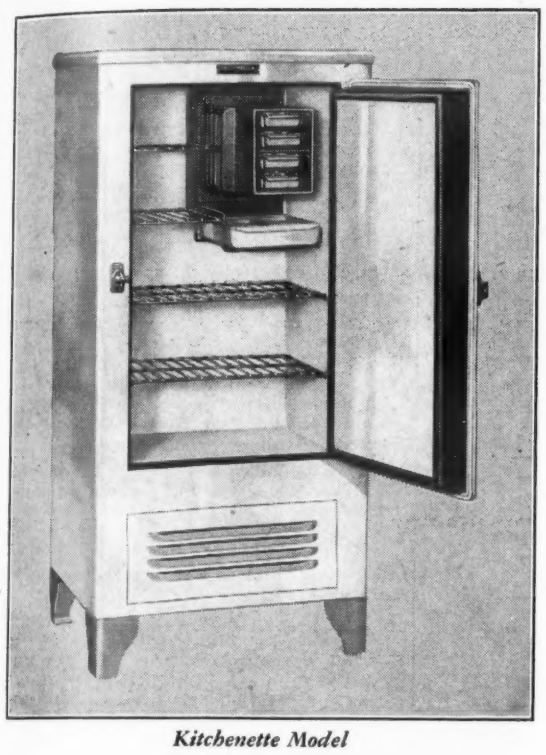
New York, Dec. 30, 1929.

Electric Refrigeration News,
Detroit, Mich.

In your issue of December 18th you have listed Servel as using sulphur dioxide as a refrigerant. This is an error. Servel employs methyl chloride exclusively. Will you please make proper correction?

SERVEL, INC.
E. T. WILLIAMS, Consulting Engineer.

Electrolux *swings ahead* to even greater POPULARITY



Kitchenette Model

Three great cities blazed the way for the phenomenal success of Electrolux in 1929.

New York City took the lead. "Cold" to new products, the most difficult market in the world said "We want Electrolux" with nearly 30,000 orders. And sales are still soaring.

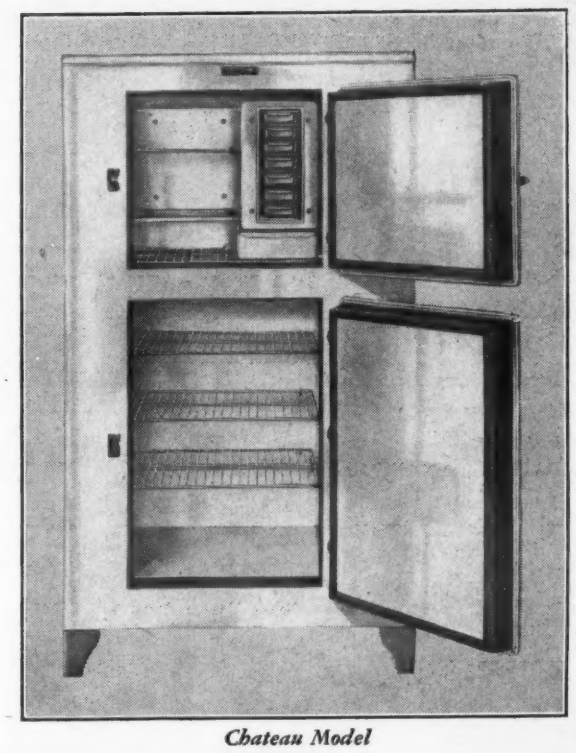
In Chicago, Electrolux retail sales have increased so fast that a spacious new showroom has been opened in the exclusive Oak Park section. During the past year, monthly sales have increased sometimes as much as 100% over the month before. July retail sales, for example, were 25% over June, and August 100% over July.

Brooklyn owners, replying to a questionnaire, not only enthusiastically endorsed Electrolux, but added voluntarily that they were telling their friends about it. Perhaps that's why Brooklyn sales show such a remarkable increase.

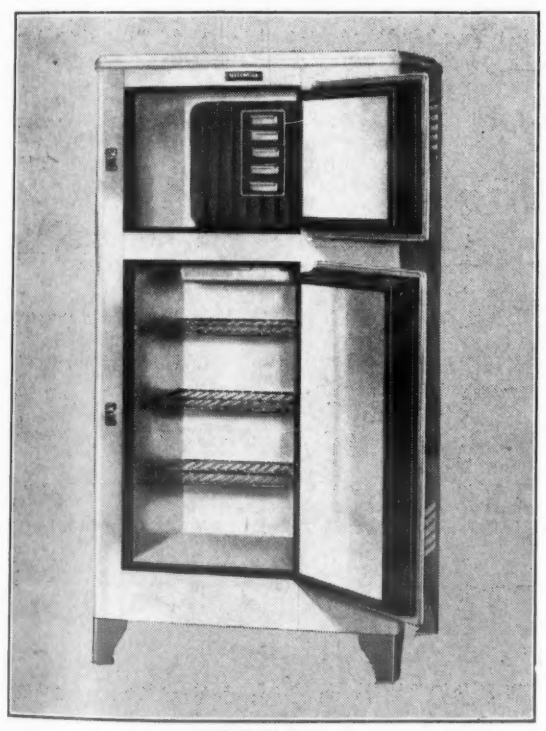
Philadelphia has followed suit. Similar stories of greatly mounting sales are coming in from Boston, Los Angeles, Atlanta and other cities. No section of the country has an exclusive claim to success. The swing to Gas Refrigeration is nation-wide.

This growing preference is the result of the many exclusive advantages of Electrolux—inherent advantages based on principle and design.

Powerful national advertising is making Electrolux a household word . . . instilling in every housewife the ambition to own this refrigerator that makes no sound, operates at far less cost, and lasts indefinitely. The market for Electrolux is unlimited. Franchises are still available. For information, write, wire or phone Electrolux Refrigerator Sales, Inc., Evansville, Ind.



Chateau Model

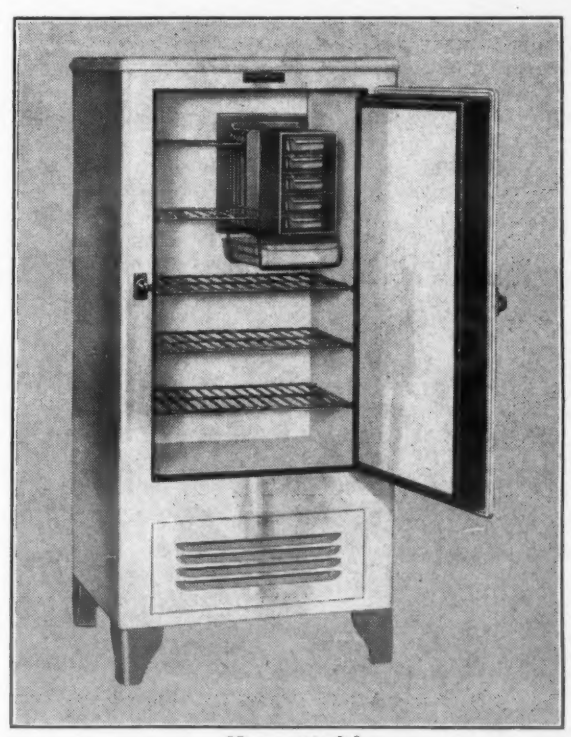


Chef Model

ELECTROLUX

THE *Gas* REFRIGERATOR

A tiny gas flame takes the place of all moving parts



Hostess Model

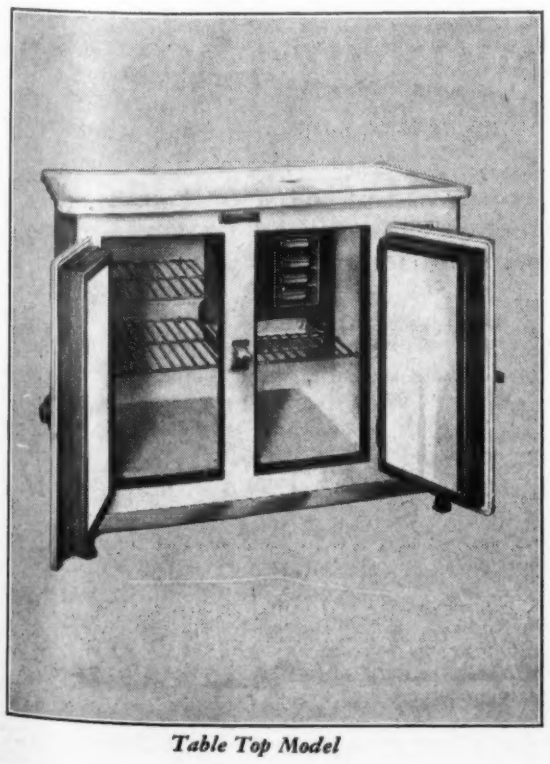
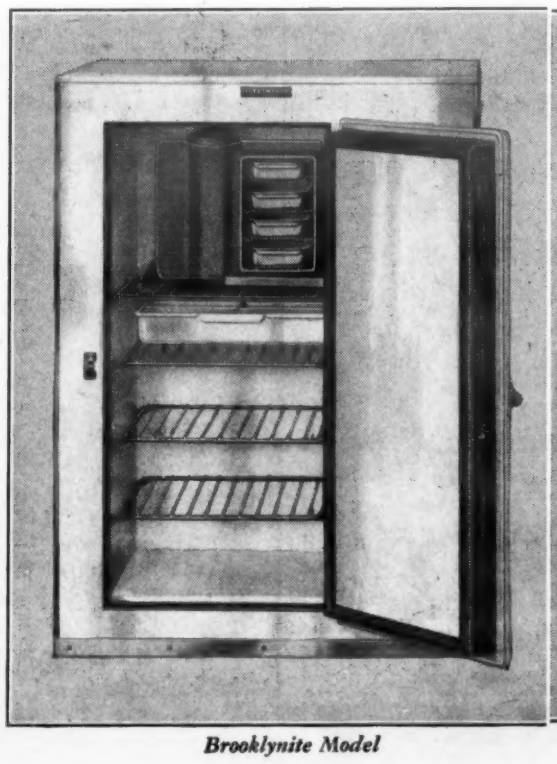
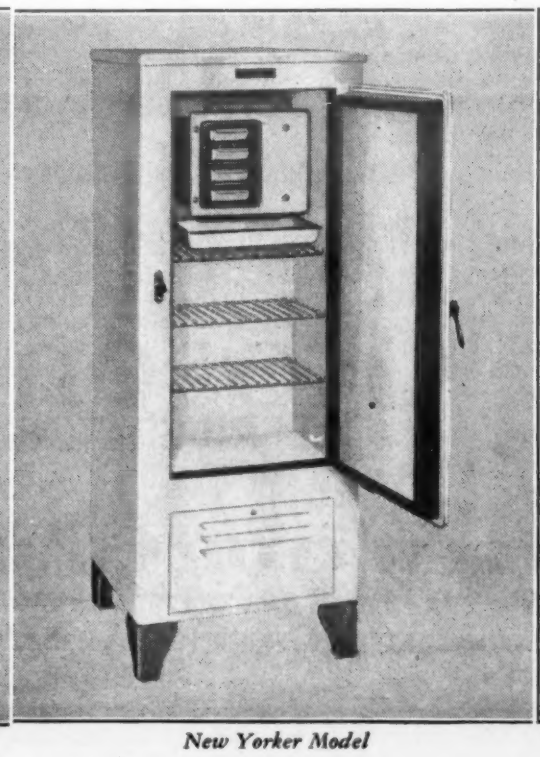


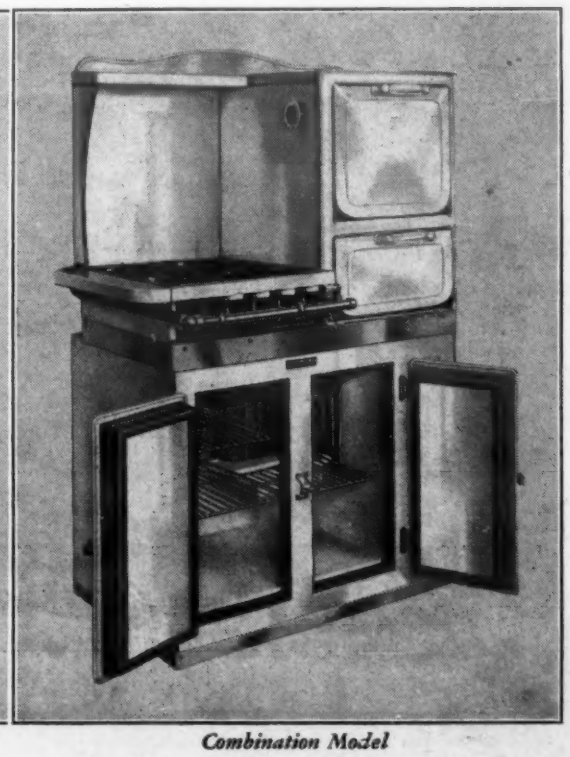
Table Top Model



Brooklynite Model



New Yorker Model



Combination Model

European Refrigeration Business Takes to Air Travel

BARON LUIGI PARRILLI, manager of the European Division of the Kelvinator Corporation, who spent several weeks in Detroit recently, is shown with Alfred Leroy, vice-president of the German Kelvinator A. G., landing on at the airport field after a trip from Zurich to Leipzig.

The Baron says that, despite the rapid growth of air-mindedness in the United States, air traveling is still far more popular in Europe. "I have taken enough air trips in the course of the last year to equal the mileage between Paris and New York," he writes, "and have found this rapid method of getting from place to place of great assistance to me in my work of organizing our European Kelvinator business and keeping in touch with our distributors."

RISE IN EUROPEAN BUYING POWER WILL AID REFRIGERATION

"Europe has almost entirely ignored the American stock market reaction; business overseas is good and promises to improve; the good work already done in electric refrigeration is daily becoming more fruitful." This is the message brought to America by Werner Schoop, European director for the H. M. Robins Co., export distributors of Copeland Products, Inc.

Mr. Schoop is in America for a month, to confer with the Robins Co.'s officials, to study American sales methods, and to take a course at the Copeland factory in manufacturing, distribution and service methods.

"The future of electric refrigeration in Europe is bright, even though making Europe a refrigeration-owning continent probably will be a protracted process," says Mr. Schoop. "The difficulty lies, not in Europe's refusal to accept electric refrigeration, but in its inability to purchase it.

"The fact that the average housewife never has made use of refrigeration of any type is no handicap in selling her electric refrigeration. Nor is the fact of never having known the benefits of refrigeration one that makes her skeptical of their value. Thus the gap between no refrigeration and automatic refrigeration is not a difficult one to make her cross, mentally, but her purse prevents her from actually leaping that gap.

"The penetration into all countries of Europe by American business is going to be a big factor in future electric refrigeration sales. Every type of American industry is locating on the continent. The result will be a raising of wages and buying power and the standard of living. Europe today may only yearn for electric refrigeration. Tomorrow it will be able to buy it. Today it may regard it as purely a luxury. Tomorrow it will consider it a necessity," said Mr. Schoop.

"Meanwhile, we are having little trouble in making the householder in all countries of Europe refrigeration-conscious, as you would say in America. The rapid fashion in which we are installing electric refrigeration in stores, shops, etc., is our greatest aid. Through these installations we are educating the European householder in electric refrigeration. He is learning of the existence of such a thing and of its value. When—and that will not be a distant day—he is able to buy refrigeration for himself, he will take advantage of that buying power.

"I would regard Europe as a greater factor in the future of the American electric refrigeration industry than as a factor in the future of the automobile industry," concluded Mr. Schoop.

ALASKA MAKES CHANGE IN CORPORATE TITLE

Muskegon, Mich.—Alaska Refrigerator Co., manufacturers of Alaska refrigerators and electric cabinets, announces a change of corporate name to Alaska Refrigerator Corporation.

There is no change in the management or policies, and the new corporation acquires all the assets and assumes all the obligations of the old company, the new corporation being created to permit redistribution to stockholders of stock acquired from Coldak Corp. All capital connection with Coldak Corp. terminated May 20, 1929.

EXPERIMENTAL PLANT OPENED BY DEVON

Boston, Mass.—Devon Mfg. Co., 1 Federal St., has established an experimental plant at 2 Brook St., Brighton, Mass. Reports indicate that the Devon company will soon be operating on a greatly enlarged production basis.

TWO DISTRIBUTORS EXHIBIT AT IOWA FOOD SHOW

Des Moines, Iowa.—Local branch of Frigidaire Corp., an Iowa distributor of General Electric, had attractive exhibits of domestic refrigerators at the annual Food and Cooking Exposition held here recently.

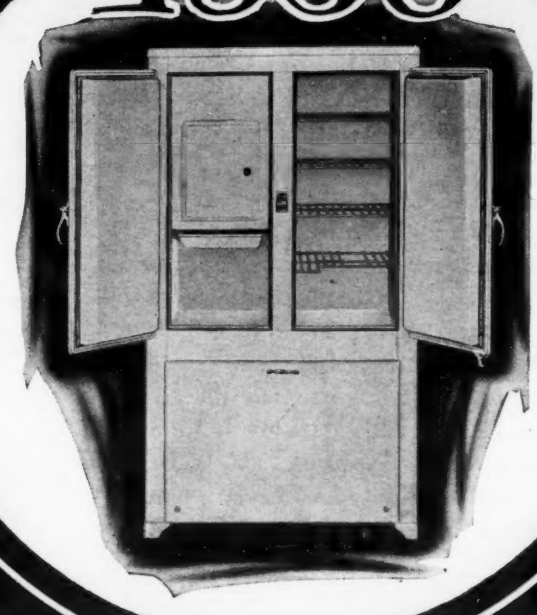
CHICAGO WAGNER BRANCH CHANGES ADDRESS

Chicago, Ill.—Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo., has moved its local sales office and service station to 1935 Indiana Ave.

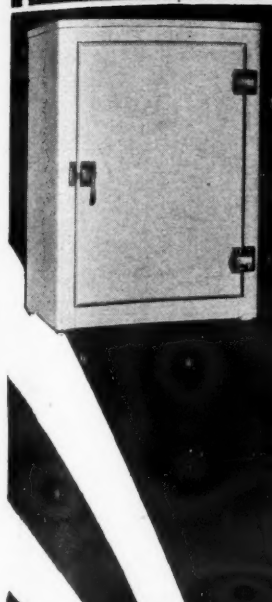
TONG WAR

Electrical refrigeration has become so popular that the icemen are threatening the manufacturers with a tong war.—*Exchange.*

The NEW 1930 REX LINE



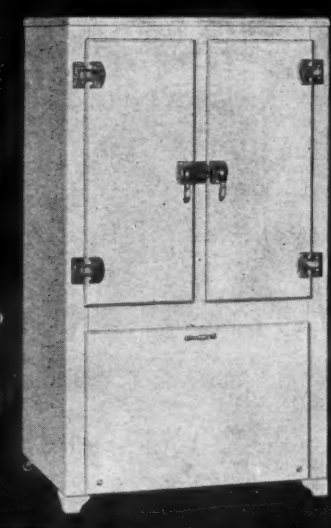
MODELS LE-S-40 and LP-S-40
(4 Cubic Feet Net)



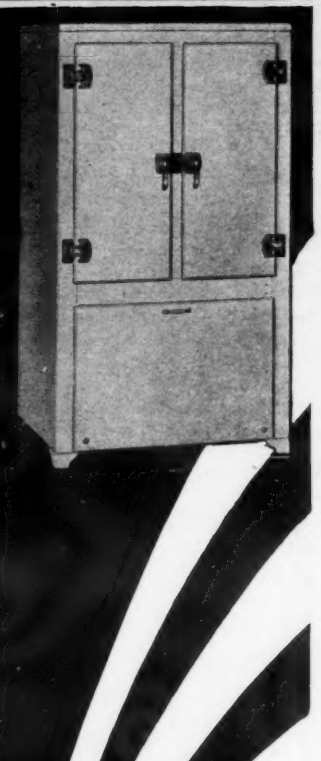
MODELS LE-M-40 and LP-M-40
(4 Cubic Feet Net)

MODELS LE-H-40 and LP-H-40
(4 Cubic Feet Net)

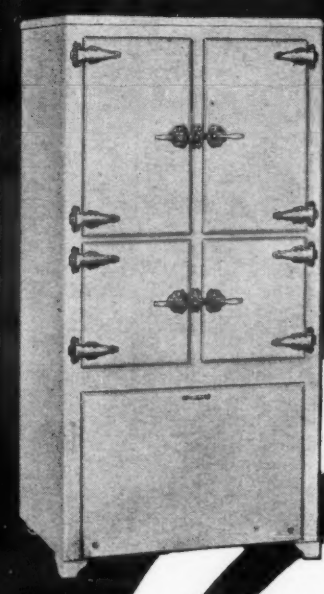
MODELS LP70 and P70
(7 Cubic Feet Net)



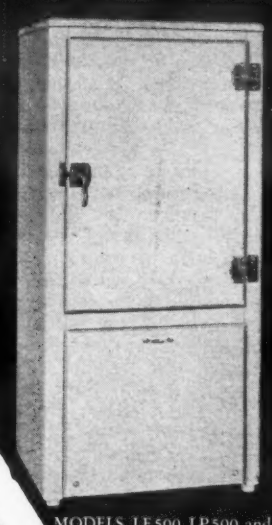
MODELS LP550 and P550
(5½ Cubic Feet Net)



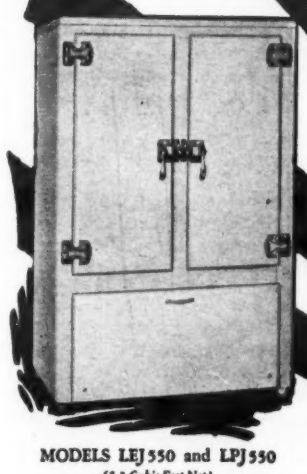
MODELS LP90 and P90
(9 Cubic Feet Net)



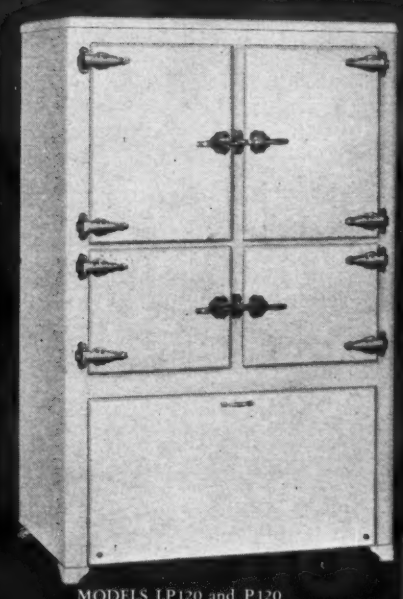
MODELS LE500, LP500 and P500
(5 Cubic Feet Net)



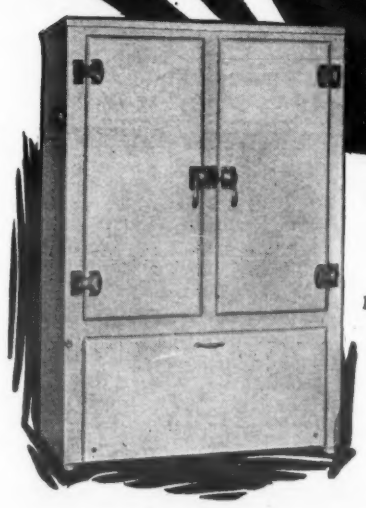
MODELS LEJ550 and LPJ550
(5.3 Cubic Feet Net)



MODELS LP120 and P120
(12 Cubic Feet Net)



MODELS LPJ70 and PJ70
(7 Cubic Feet Net)



MODELS LP150 and P150
(15 Cubic Feet Net)

There are three four-foot models—one sink height and one with storage space, for remote installation—one self-contained type. The five-foot model is also self-contained. The two-door models are especially designed for the builders' trade.

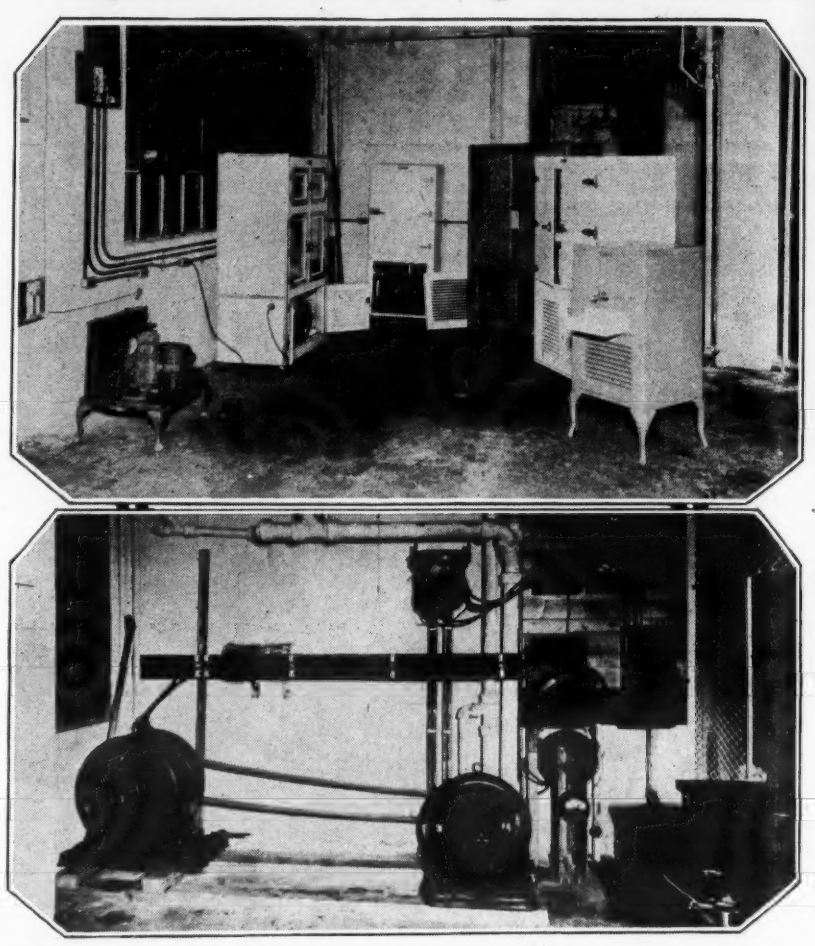
The Residence Models illustrated above offer a range of sizes that make them suitable for any size home. The New 1930 REX Catalog is now ready. Write.

REX Manufacturing Company has conceived, designed and built many beautiful cabinets. Today, when sales are more dependent on cabinet beauty than at any time in the history of electric refrigeration, the Rex organization is equipped to produce a cabinet that answers every need or demand . . . The Complete 1930 REX Line is illustrated above. Detailed specifications and prices will prove as interesting as the beauty of the new models.

REX MANUFACTURING COMPANY

CONNERSVILLE, INDIANA, U.S.A.

Unique Merchandising Combination



(Above)—Testing electric refrigerators in the C. C. Harvey service department before sending them out for installation. (Below)—Generating plant for producing alternating current to test A. C. current type units.

KNOWN for thirty-five years as "The Music Center of Boston, Mass.," the C. C. Harvey Company, distributor for Servel, is successfully combining the merchandising of electric refrigerators with that of musical instruments. This pioneer firm, with dealers operating in eastern Massachusetts and retail distribution for metropolitan Boston and through its branch stores at Lynn and Brockton, is apply the same energy and thoroughness, both in refrigeration sales and service, that has characterized its merchandising of pianos, phonographs and radios in years past.

A separate sales and service organization handles the refrigeration end of the business. After acquiring the Servel franchise, it was determined to make service the keynote of the refrigerator organization. Past experience with pianos and other musical instruments had taught them that what the public wants, expects, and responds to most frequently is service. To give good service meant building up a highly trained service organization, as well as a well trained selling and estimating organization.

The Harvey Company installs not only domestic refrigerators, but handles apartment contracts and commercial refrigeration for markets and other stores. The largest unit handled in the commercial line is a one horsepower machine.

CLOCK FINDS TIME TO SELL REFRIGERATORS

PERSONAL recommendation counts for more in the sales of electric refrigeration than the most convincing sales arguments put forth by high-powered salesmen.

But ask a customer to give you the name of a prospect and she will say she can't think of any at the moment. Or, at your request, she may promise to recommend electric refrigeration to a friend. What happens then? In nine cases out of ten she forgets all about it.

But offer her a tangible expression of appreciation for her recommendation. Make it something unusual and desirable. You will find that she will not only give you the names of as many prospects as she can think of, but will also do her best to influence them to buy.

This has been the experience of Phillips & Ibsen, Inc., of Nyack, N. Y., Rockland County General Electric refrigerator dealers, who offered a gift of an electric kitchen clock to every customer through whose recommendation a sale was effected.

The clock is a Telechron mechanism installed in a frame which is an exact duplicate of the General Electric refrigerator. It is very striking, attracts lots of attention, and is being used in this manner by General Electric distributors all over the country.

Phillips & Ibsen divide the expense of every clock given away with the salesman, each paying $4.25. Since every clock meant a sale consummated, the salesmen were quite willing to share in this slight expense.

Every customer who had purchased a refrigerator received a letter explaining the offer. With the letter went a circular furnished by the General Electric Company, showing a picture of the electric clock.

All the customer had to do was to furnish the name and address of a friend whom they believed to be interested in purchasing an electric refrigerator. Introductory cards and a return envelope were enclosed for this purpose. The customer was also asked to recommend the General Electric to this prospect and try to influence the sale.

Soon after this mailing, cards began to come back to the office filled in with names of prospective customers. In some cases the salesmen made personal calls on customers and explained the offer. A few customers requested that their name should not be mentioned in calling on the prospect whose name they gave. In every case this wish was respected.

"We have found this campaign to work out very well," says Mr. Ibsen. "Our sales have jumped considerably and the word-of-mouth advertising and good will has been very gratifying. Customers were very eager to obtain this prize and some of them worked real hard on their prospects. In other words, we put our customers to work selling refrigerators for us. During this campaign, through recommendation, we sold a refrigerator to a woman who had never used a piece of ice in her life! I should say that a dealer does well to offer some sort of an unusual prize to induce customers to actively influence their friends to buy refrigeration."

CHEMICAL EXHIBITS PLANNED FOR 1933 FAIR IN CHICAGO

New York, N. Y.—A Chemical Engineering Committee, to be composed largely of members of national associations, is being formed by Dr. Alfred H. White, head of the department of chemical engineering, University of Michigan, to develop plans for a chemical engineering exhibit to be given at the Chicago Century of Progress celebration in 1933. This exhibit is to be part of a comprehensive science theme that is being worked out by the National Research Council's Science Advisory Committee, 40 West 40th St.

Members already appointed to the committee include Crosby Field, American Society of Refrigerating Engineers; H. J. Rose and R. B. Harper, American Gas Association; Stanley Krall, Rubber Manufacturers Association; R. G. MacDonald and W. G. MacNaughton, Technical Association of the Puly and Paper Industry; S. H. Wilder, Manufacturing Chemists Association of the United States; William G. Schneider, Copper and Brass Research Association, and R. A. Plumb, American Paint and Varnish Manufacturers.

FRIGIDAIRE PREPARES FOR INCREASED FOREIGN SALES

Dayton, Ohio.—Keeping pace with the development of its export business, Frigidaire Corp. has announced that it will open regional offices about the first of the year in Montevideo, Uruguay, South America; Sydney, Australia, and Bombay, India. These headquarters offices will be similar to those which are maintained in Paris, France, for European sales operations.

All South American business will be handled through the offices in Montevideo, which will be in charge of F. E. Sheehy. Two factory representatives, A. S. Collier and C. R. Hill, have already sailed for South America to do field work from the new headquarters.

Australian regional offices at Sydney will be in charge of N. W. Van Ausdal, formerly assistant European manager. W. W. Rose, who has spent the past two years in India, will direct activities of the Bombay regional office.

NEW ENGLAND MEN READY FOR COPELAND MEETING

Boston, Mass.—Northeastern Radio, Inc., distributors for Copeland electric refrigerators in Maine, New Hampshire, Vermont, Rhode Island and Eastern Massachusetts, will be host to the Copeland dealers in their territory on a trip to Detroit to attend the Copeland Convention which is to be held Jan. 13-14.

Ayers-Lyon Corp., Copeland factory representatives in the same territory, are assisting Northeastern Radio in their plans for the trip, which include several special cars connected to the Wolverine, to leave Boston Sunday, Jan. 12.

The party will be headed by A. Ullman, president of Northeastern Radio. He will be assisted by I. Feldman and Byron Drew, of Northeastern Radio, and by Bill Lyon and George Sprague, of Ayers-Lyon Corp.

BROOKMIRE REPORTS ON REFRIGERATION GROWTH

New York, N. Y.—Special report No. A-241, by Brookmire Economic Service, Inc., 551 Fifth Ave., entitled, "Electrical Refrigeration Industry Expanding Rapidly," quotes data regarding the number of units sold since 1914 as follows:

Sales of Domestic Electric Refrigerators

(These do not include the larger refrigerators sold for hotels and other commercial purposes.)

1914	600	1922	10,000
1915	800	1923	16,000
1916	1,000	1924	24,000
1917	1,200	1925	75,000
1918	1,400	1926	200,000
1919	2,000	1927	365,000
1920	4,000	1928*	550,000
1921	6,000		

*Estimated.

"The foreign demand for American household electric refrigerators is also growing in leaps and bounds. The total foreign sales of all refrigerating equipment during 1928 amounted to more than $8,700,000, as compared with $6,700,000 in 1927, $4,300,000 in 1926, and only $1,700,000 in 1925. Canada is our best customer, accounting for about 29 per cent of 1928 foreign sales, followed by Australia, which went ahead of the United Kingdom last year. The prospects are for continued growth in foreign demand.

"The electrical refrigeration industry will continue to show much progress during coming years. The theoretical market is limited only by the number of homes wired for electricity. Room for continued expansion of sales is very large, since there are slightly more than 19,000,000 wired homes in this country at the present time. Assuming that there are now 1,225,000 electric refrigerators in use, this would mean that about one out of every fifteen wired homes contains an electric refrigerator. In comparison with automobiles and radios, it would appear that the theoretical market for electric refrigerators has hardly been touched. The number of wired homes in the United States as of January 1st of each year since 1917 is shown in the following table:

Number of Wired Homes

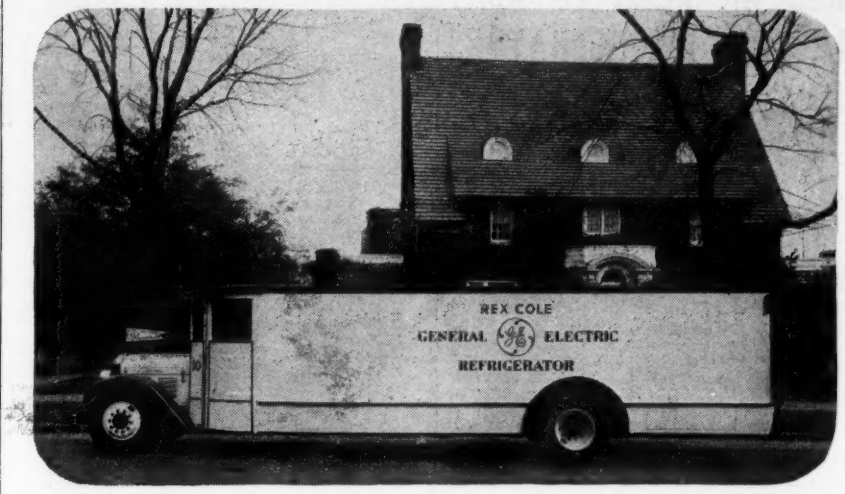
(January 1st)

1917	5,260,000	1924	11,623,000
1918	5,825,000	1925	13,406,777
1919	6,900,000	1926	14,532,930
1920	8,010,000	1927	16,359,279
1921	8,700,000	1928	17,596,390
1922	9,430,000	1929*	19,000,000
1923	10,300,358		

*Estimated.

For Annual Directory of Manufacturers see pages 35 to 43

Big Bill Board on Wheels



A VERITABLE bill-board on wheels is the latest addition to the fleet of seven black and white liveried trucks of Rex Cole, Inc., that carry General Electric refrigerators twice each week into every section of the distributor's territory.

The truck which is thirty feet long, and more than eight feet high, was designed to transport quantity installations to New York apartment houses from the Long Island City warehouse.

G. E. DISTRIBUTOR IN NEW YORK TO MOVE; TAKES 10 YR. LEASE

Manhattan, N. Y.—Rex Cole, Inc., 551 Fifth Ave., New York, distributor of General Electric refrigerators, has leased the basement, showroom and second floor of the 20-story building located at 257 to 265 Fourth Ave., southeast corner of 21st St., for ten years.

The building in which the new quarters are to be situated was erected in 1912. At first it was known as the Eagle Building; later it was renamed the Gramercy Park Building. In accordance with the terms of the lease, it will now be designated as the Rex Cole Building.

Renovation of the building, being done from plans by Raymond Hood, Godley and Fouilhoux, architects, is expected to be complete Jan. 1, at which time Rex Cole, Inc., will remove from its present quarters at 551 Fifth Ave. The present plan of the corporation is to maintain its retail display room at 7 E. 45th St.

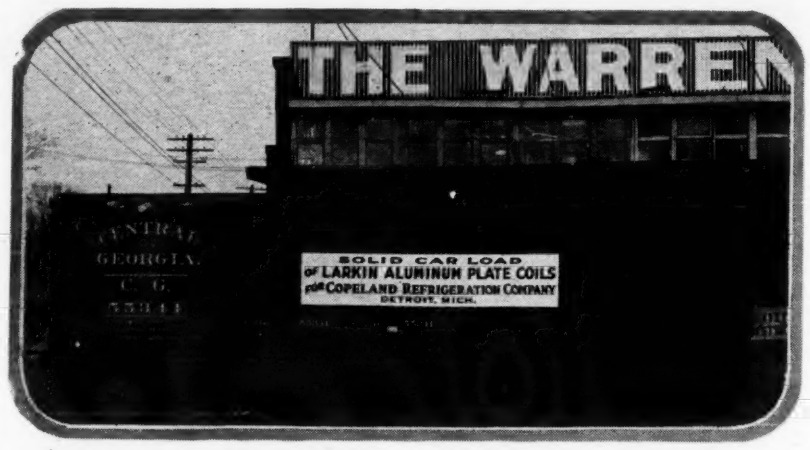
CANAL ZONE EMPLOYEES VOTE ON PLAN TO RENT ELECTRIC REFRIGERATORS

Washington, D. C.—According to information received by the Electrical Equipment Division, U. S. Department of Commerce, from Fred C. Rogers, secretary to the Commercial Attache at Panama City, Panama, a plan providing for the purchase of electric refrigerators by the supply department for Canal Zone employees, has been pending the decision of a majority of the 2,000 persons to whom a questionnaire regarding it were sent.

The plan, if carried through successfully, would provide for the leasing of the refrigerators to Canal employees at a rental rate of five dollars per month, plus cost of operation.

Action on the plan awaited replies to the questionnaire sent out, and if the replies were received before the December session of the board of directors of the Panama railroad, they were to have been laid before that body for approval. Final decision on the plan depends upon the way in which the employees receive the idea.

A Car Load of Larkin Coils



INITIAL car load shipment of Larkin Dry Expansion coils to Copeland. Shipments of the new Larkin coils are now being made by the Larkin Warren Refrigerating Corp. of Atlanta, Ga., to Copeland, Trupar, Universal, Absopure, Kulair, Ice-O-Matic and Royal, where Larkin coils have been adopted as standard equipment.

EDUCATIONAL BOOKLETS DISTRIBUTED TO PUBLIC BY ICE ASSOCIATION

HOUSEHOLD Refrigeration Bureau of the National Association of Ice Industries, 163 W. Washington St., Chicago, has issued eleven booklets dealing with refrigeration, written by Miss M. E. Pennington. Titles and a brief summary of their contents follow:

The Refrigerator in the Home. It should be well insulated to preserve food wholesomeness, food economy and food quality. It should not be overloaded, thus interfering with air circulation; hindered circulation causes temperature to rise.

Ice Cream Making and Appliances in the Home. Recipes and directions for freezing ice cream and the kind of freezer to use are given in this booklet. Tables show the approximate temperatures obtained with different weight mixtures of ice and salt.

Where to Place Food in the Household Refrigerator. Foods requiring the lowest temperatures should be placed in the coldest part of the food chamber; commodities not requiring low temperatures can be placed in less cold locations. Location of food depends on type of refrigerator used: two types, side-icer and over-head.

The Care of the Home Refrigerator. Place in cool and protected position convenient for service, level on floor. Keep dirty things out, keep refrigerator dry, wash it, and keep doors closed.

The Care of the Child's Food in the Home. Emphasizes need of quick cooling of milk and steady maintenance of temperatures, as near 45 degrees Fahrenheit, or less, as possible. Directions for the care of baby's orange juice, prunes, tomato juice, vegetable, milk and meat soups, and cod-liver oil are given in this booklet.

Why We Refrigerate Foods. Because perishable foods decay easily, warmth hastens decay in foods, tiny plants cause food decay, and because molds, yeasts and bacteria thrive in heat. Refrigeration excludes dust and flies, keeps cooked foods clean and cold and fresh.

The Romance of Ice. Ice and snow were used by early Greeks, Egyptians, Italians, Mohammedans, and other ancients for chilling drinks and freezing creams and ices. This booklet gives facts on the cooling power of ice and tells how to take advantage of it. The part ice plays today in the welfare of society is discussed. Responsibilities of the ice industry, and how it is meeting them, are told.

Cold is the Absence of Heat. Cold is a relative state produced by the withdrawal of heat. Because warm air is lighter in weight than cold air, heat will travel from a warm to a cold body. This changing or circulation of air from one body to another is caused by alternate warming and cooling.

Journeys with Refrigerated Foods. Eggs shipped from the Pacific Coast to the Middle West cities are kept fresh by refrigeration. This booklet traces the egg from the time it is laid until it is consumed at the breakfast table, and shows the necessity of refrigeration during that period.

How to Use a Good Refrigerator. Temperatures in a good refrigerator will not be above 45 degrees Fahrenheit on the top shelf in the overhead type of box, and the average temperature of the large food compartment will not be over 50 degrees Fahrenheit. Applying interest and intelligence to the operation of the refrigerator in the home will repay the housewife many times in healthfulness, palatability and lessened waste.

Home Refrigeration of Fresh Vegetables. Stresses the increased use of vegetables in the home, and states that dietitians recommend a minimum of at least two, other than potatoes, be eaten daily. Vegetables can be kept in a good, raw condition with proper refrigeration. This will preserve their maximum food value.

TWO FOREIGN DISTRIBUTORS ANNOUNCED BY FRICK

Waynesboro, Pa.—Frick Co. announces the appointment of two new distributors overseas, one in England and one in France.

The English house is Bratby & Hinchliffe, Ltd., Ancoats, Manchester. This firm was established in 1850, and has been particularly active in the dairy and bottling trades.

The French distributor is the Societe Generale de Material Frigorifique (liberally translated, The General Refrigeration Supply Company). A substantial order of Frick compressors has already been sent to their address, 147 Boulevard Serurier, Paris.

E. G. MORGAN JOINS FRICK DISTRIBUTING BRANCH

Dallas, Texas.—E. G. Morgan has joined the organization of the Central Engineering & Supply Co., Dallas distributors for Frick Co., Waynesboro, Pa. Mr. Morgan has, for more than twenty-five years, been engaged in selling Sterling refrigeration machines for United Iron Works, Springfield and Kansas City, Mo., which firm has lately discontinued its refrigeration department.

Electric Refrigerator Leads as Central Station Sales and Revenue Producer

N. E. L. A. Prize Research Shows It to Be Best Seller During Seven Months of Year

Chart A

RANK	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	Washers	Washers	**Refrigerators**	**Refrigerators**	**Refrigerators**	**Refrigerators**	**Refrigerators**	**Refrigerators**	**Refrigerators**	Cleaners	Flat irons	Cleaners
2	Cleaners	Cleaners	Washers	Cleaners	Cleaners	Cleaners	Desk fans	Ranges	Flat irons	Flat irons	Cleaners	Flat irons
3	Flat irons	**Refrigerators**	Cleaners	Washers	Ranges	Ranges	Ranges	Flat irons	Ranges	**Refrigerators**	**Refrigerators**	Toasters
4	**Refrigerators**	Flat irons	Ranges	Ranges	Flat irons	Flat irons	Washers	Washers	Cleaners	Ranges	Ranges	Waffle irons
5	Ranges	Kitchen units	Ironers	Flat irons	Washers	Washers	Cleaners	Cleaners	Washers	Toasters	Toasters	Percolators

Rank based on dollar value of appliances sold in 1927. Example: Electric refrigerators produced greater sales volume than any other appliances sold from March to September, inclusive.

A METHOD of building an itemized budget for appliance advertising appears in November, 1929, issue of N. E. L. A. Bulletin, issued by the National Electric Light Association, New York City. The article, "A Study of Merchandise Advertising," was prepared from research material by Keo Currie and Ray Warren, and won the James E. Davidson first prize award for 1928-29. Miss Currie has recently joined the staff of Arnold Research Service, with headquarters in New York. Mr. Warren is chief clerk of the Advertising and Publicity department and secretary of the Advertising Committee of the Public Service Co. of Northern Illinois.

Results of the investigation carried on by these two individuals, besides leading to definite ideas for a better control over disbursements of advertising appropriations and to a method of solving the public utility accounting problem, indicate the extended growth of electric refrigeration during the past few years. And that growth has been rapid, as is shown by the following statement from the Bulletin: "A few years ago, refrigerators had no sales record but they had to be advertised. The advertising was based upon an estimate of expected sales. Today, a large volume is done in this appliance. It ranked first of all electric appliances in this study of 1927 figures, in its dollar volume of sales."

Advertising costs and sales volume of a certain group of stores during 1927 were used as a basis for the investigation. The advertising given each appliance during the year 1927 was computed in dollars, based upon the amount of space given the appliance, either in newspaper or in some form of direct mail advertising. Accurate figures were available as to the number of each appliance sold during 1927. The sales volume for the year for each appliance was estimated, as carefully as possible, by establishing an average selling price for each appliance and multiplying this by the number sold during the year.

These two theories were investigated during the study: that each appliance should receive advertising in direct proportion to the sales it earns, and that the load added to a company's line by use of appliances should also be made a definite factor in determining advertising appropriation.

Load revenue derived from each appliance was obtained from surveys and reports of N. E. L. A. on this subject. In case certain appliances sold were not included in N. E. L. A. reports, careful estimates were made on local data and opinion.

Chart A lists the five best-selling appliances in each month of the year. Electric refrigerators were the "best-sellers" in seven months of the year, and placed among the first five in every month except December.

Chart B gives rank of electric appliances, based upon annual results, used in the compilation of this article by Miss Currie and Mr. Warren. In the first column, appliances are listed according to annual sales, in the second column according to annual load revenue derived, and in the third according to their total income—sales plus load revenue.

Chart B

RANK OF TWENTY ELECTRIC APPLIANCES

RANK*	ANNUAL SALES VOLUME	ANNUAL LOAD REVENUE	ANNUAL COMBINED INCOME**
1	**Refrigerators**	Irons	**Refrigerators**
2	Cleaners	Ranges	Irons
3	Irons	Kitchen Units	Cleaners
4	Washers	**Refrigerators**	Ranges
5	Ranges	Toasters	Washers
6	Toasters	Cleaners	Toasters
7	Ironers	Desk Fans	Kitchen Units
8	Waffle Irons	Space Heaters	Ironers
9	Desk Fans	Percolators	Waffle Irons
10	Percolators	Waffle Irons	Desk Fans
11	Kitchen Units	Ironers	Percolators
12	Sewing Machines	Water Heaters	Space Heaters
13	Heating Pads	Ventilating Fans	Heating Pads
14	Space Heaters	Heating Pads	Sewing Machines
15	Ventilating Fans	Washers	Ventilating Fans
16	Water Heaters	Curling Irons	Water Heaters
17	Hair Dryers	Hair Dryers	Curling Irons
18	Curling Irons	Cookers	Hair Dryers
19	Sewing Motors	Sewing Machines	Sewing Motors
20	Cookers	Sewing Motors	Cookers

*Based on dollar value of appliances sold in 1927.
**Sales plus load revenue.

ELECTRIC REFRIGERATION NEWS

The Business Newspaper of the Refrigeration Industry

PUBLISHED EVERY TWO WEEKS BY

BUSINESS NEWS PUBLISHING CO.

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Problems and Progress

BACK in 1926, when the first co-operative movement among electric refrigerator manufacturers was getting under way, J. Robert Crouse* summed up the major problems of the industry in three words, namely: "Personalities, Policies and Patents." Later developments have shown that the alliteration may easily be continued by adding to the list such key words as: Power (public utilities), Preservation (of food), Protection (of the public—and the industry), Prices and Profits.

It is significant that the clashes between Personalities and the battles over Policies which have made news during 1929 have largely revolved around the problems mentioned above. That the industry is making real progress is indicated by the passage of certain well defined points along the path in the settlement of these problems.

Patents are necessarily a matter of prime importance in a new industry in which mechanical principles play such a fundamental part. While the present trend of invention is mainly in the direction of improvement on present devices, there remain a number of basic patents filed by pioneers in the industry, which have not yet been tested in the courts. Early in the year, however, the News reported the proceedings of a very important legal contest involving one of the basic elements in electric refrigeration design. The record of the case proved to be of unusual interest because it brought to life much historical data regarding the early development of the art.

Policies of public utility companies affecting the merchandising of appliances have always been a puzzle to the independent merchant, particularly when he has just plunged into his first experience in the field. The fact that the power company enjoys a monopoly in the territory served and that its principal source of profit is in the current-consuming proclivities of the product, puts the power company in a peculiar position. The situation has been the cause of many local conflicts. During the year just past one longstanding quarrel came to a head. In this case a prominent Philadelphia manufacturer endeavored to put a stop to power company competition by appeal to the Federal Trade Commission and the Pennsylvania courts.

Preservation of food being one of the principal purposes for which the electric refrigerator was designed, as well as being the primary function of ice, it was reasonable to expect that the differences of opinion as to the proper principles to be applied in performing this function would, sooner or later, reach the point of active dispute. When the National Food Preservation Compaign was presented to the public during the past summer an argument of considerable proportions was started by the proposal to educate the public that poison lurks in all food not kept at a temperature below the 50-degree "danger line."

Publicity concerning accidents in Chicago broadcast in the newspapers during the early part of the summer became the basis for a prolonged discussion regarding the proper means for protecting the public against the hazards of poisonous gases. Due to the aggressive personality of one public official, the situation reached the stage where many industry representatives took the position that the industry needed protection quite as much as the public. Fortunately the principal parties to the dispute recently reached a compromise which will provide the basis for uniformity of national, state and local regulations governing the installation and inspection of equipment.

Prices represent one of the most active causes of periodic disturbances of the peace of local groups in the industry. The penalties which the government imposes for price-fixing makes it impossible to dispel the evils of price-cutting by the practical process of agreement. Much good can be accomplished, however, by bringing participants together and pointing out the perils of pernicious competitive practices.

Profits, which were conspicuous by their absence during the development period of the industry, are now appearing as a pleasing contrast. Plus figures are showing up on the balance sheets of prominent manufacturers and distributors. Sales departments are pointing with pride to the percentage of increase compared with previous periods, and production executives are making plans for expanded output.

Prosperity for the industry during the coming year is predicted. The potential possibilities are so great and past progress has been so rapid that there is every reason to look forward to 1930 as a year of promise.

*J. Robert Crouse, then president of the Nizer Corporation (which later became a part of the present Kelvinator Corporation) was the leader in the organization of the Electric Refrigeration Council, the initial membership of which consisted of the Nizer, Kelvinator, Frigidaire, Servel, Copeland and General Electric companies. More than a decade before Mr. Crouse organized The Society for Electrical Development. Because of his active interest in promoting co-operative activities he became known as "The Father of Co-operation in the Electrical Industry."

Copeland Field Men Attend School

FIELD men who will help inaugurate Copeland Products, Inc., new zone system of sales and distribution. They have been attending a 30-day school at the plant. The new system will be put in effect immediately. Left to right (Seated): Harry J. Beurmann, D. B. Henry, factory representative; Henri A. Brysselbout, commercial sales; W. D. McElhinny, vice-president in charge of sales; F. N. Pattison, sales department; C. W. Hadden, executive staff. (Second row) R. J. King, H. W. Cline, T. F. McMurray, O. J. Hinger, M. G. Broad, J. R. Smith, F. E. Obert, H. Weaver. (Third row) G. C. License, O. W. Beebe, V. E. Kirpatrick, H. B. Pettibone, J. F. Wood and A. S. Hogan.

Editorial Aims of the News

(Reprinted from the first issue of *Electric Refrigeration News*, September 11, 1926.)

To encourage the development of the art.
To promote ethical practices in the business.
To foster friendly relations throughout the industry.
To provide a clearing house for new methods and ideas.
To broadcast the technical, commercial and personal news of the field.

A Plea for Old Time Confidence

"It seems strange, in this day and generation, to attribute business troubles to lack of confidence, for confidence is the foundation stone of nearly every type of commercial transaction.

"The consumer has complete confidence in the manufacturer. The great mail order houses sell millions of dollars' worth of all kinds of merchandise 'sight unseen.' All that the buyer knows of the goods is learned from pictures and printed descriptions, but the absolute truth of these representations is never questioned.

"There is no lack of confidence between the retail dealer and his customers. It is taken for granted that every article offered is just what it is claimed to be, and women buy by telephone with the same confidence that they do over the counter.

"It is only between the manufacturer and the distributor that this unfortunate lack of confidence exists, and the evil, strange to say, is of recent growth.

"I am looking forward to the time, not far distant, when there will be a mutual understanding and confidence existing between all of us engaged in industry, and when manufacturers, wholesalers, retailers, chain stores and all other classes of distributors will be able to sit down at the same table and discuss and solve their problems in an open and amicable manner.

"Let's get together." — Lester W. Mitchell, sales manager, Parsons Ammonia Co., Inc., in *Advertising Club News*, New York.

TOO MUCH KELVINATOR

Electric Refrigeration News,
Detroit, Mich.

Since I am interested in general news and developments of and in the industry and not particularly in Kelvinator, you may cancel my subscription to your paper forthwith and return any money due me as a result of this action. I believe I have paid in advance for my subscription.

I presumed your paper would deal with the general news and developments of the industry when I subscribed for it, but I find that is not so; instead it seems to be campaigning for one particular company.

B. F. ROWLAND,
2334 Waverly, Detroit.

DON'T BE TIMID!

STEWART ICE MACHINE COMPANY
3631 Avalon Blvd.
Los Angeles, Calif.,
December 19, 1929.

Electric Refrigeration News,
Detroit, Michigan.

I haven't had a copy of ELECTRIC REFRIGERATION NEWS since October 9 edition, and I don't like that so much. I would appreciate your looking into this, and if I owe you something, well, don't be timid. Step right into line and "I will try and do something for you next week." At least that is what I hear so often that I will try it on you.

No foolin'—I do miss that business newspaper of the refrigeration industry more than I miss my mother-in-law, and you can keep the box of cigars you had expected to send me this Xmas and just send the back issues of the NEWS. That will be a wonderful Xmas for me.

M. L. STEWART,
General Manager.

FIRST PERSON WHO GETS IT, KEEPS IT

Please find enclosed check for subscription to your wonderful paper, best in the refrigeration industry. Would like my subscription to start with the November numbers, as there is some good news regarding Kelvinator convention and the sales meeting. Send the NEWS to my home, for I want it for my own personal use. Otherwise it goes to the office and I may never see it, for the first person that gets it keeps it.—Roy McElhaney, 309 32nd St., Huntington, W. Va.

SALESMEN CANNOT AFFORD TO BE WITHOUT IT

Your paper is getting better every issue, and a salesman in the game cannot afford to be without it.—W. F. Hyde, Ridgeview Hotel, Evanston, Ill.

LIVE ADVERTISING

I had the pleasure to see a copy of your paper and was impressed by the news and live advertising.—C. J. Hurd, Field Engineer, Relation of Electricity to Agriculture, Corvallis, Ore.

Cool Coils for Talkie Films

MOTION picture vault equipped with shelves made of refrigerated coils. The cans in which the films are stored are set directly on the frosted pipes.

CLEVELAND LEAGUE NOW 20 YEARS OLD HOLDS BIG BANQUET

Cleveland, Ohio—Local distributors of electric refrigerators and their staffs mingled with 600 representatives of other branches of the electrical industry when the Electrical League of Cleveland celebrated its twentieth anniversary in Hotel Statler ballroom, here, Thursday evening, Dec. 12.

Prominent among those at the speakers' table was P. B. Zimmerman, a past president of the League and now general sales manager of the Refrigeration Department of General Electric Co.

"The greatest need of the entire electrical industry today, including the refrigeration branch, is well trained sales personnel," J. E. North, president of the League, said in his address. "The League can perform its greatest service to the industry in the next ten years by assisting in the creation of an agency which will produce sound salesmen.

Proposes Establishment of an Electrical Business University

"Professional salesmen for the electrical industry could be brought into being by means of an electrical business university. This institution would be capable of graduating 200 men yearly. It would teach them the fundamentals of electricity, salesmanship and business management, and imbue them with a spirit of loyalty to the industry. Manned by salesmen so trained, the electrical industry would undergo an era of prosperity unparalleled by any period we hitherto have experienced."

Other speakers were G. E. Miller, of the Cleveland Illuminating Co., first president of the League, and David Aitken, former president and chairman of the twentieth anniversary celebration committee. Program features, in addition to the addresses, were a dinner, musical selections by radio artists, and dancing.

The Electrical League of Cleveland has consistently battled to expand the market for electric refrigerators in the Cleveland area. Early in 1929 the League aroused nation-wide attention on the part of the refrigeration industry by announcing a series of temporary exhibits in Cleveland neighborhood centers, aimed at the promotion of electric refrigerators and ironers. Three of these exhibits were held in different quarters. Thousands of Clevelanders inspected the various makes of electric refrigerators shown and listened to talks on food preservation by League women employees.

Effective Co-operation with National Food Preservation Program

Later in the year the League's spectacular tie-in with the national food preservation movement again riveted the attention of the refrigeration industry on the Cleveland organization. The League carried on an extensive advertising campaign in newspapers and by radio, opened a special food preservation exhibit, and employed direct advertising to the extent of nearly 700,000 pieces of special printed matter. All Cleveland refrigerator distributors were enthusiastic over the results of the League's smashing campaign, and one distributor declared 100 inquiries to the organization's activities.

PORTABLE DEFROSTER PUT ON MARKET BY ALLEN CO.

A portable electric DeFroster for brine coil equipment, consisting of an electric heater, a circulating pump, a main switch, and a temperature control that operates an automatic heater switch, is offered by Allen Mfg. & Welding Co., Inc., 726 Washington St., Buffalo, N. Y. The DeFroster is mounted on an all-steel welded truck.

The main switch puts the DeFroster in operation, and after a hose connection is made with the brine coil, it is closed and the heater starts functioning, heating the brine in the coil until the desired temperature is obtained, when the control opens the automatic switch and heating ceases. Circulation continues, however, until the main switch is opened. Power consumption of DeFroster is about sixteen kilowatts of electricity per hour for twelve hours' operation on approximately 3,200 feet of two-inch pipe, with room temperature at slightly below zero, Fahrenheit.

CHANGES IN SPRINGFIELD FRIGIDAIRE PERSONNEL

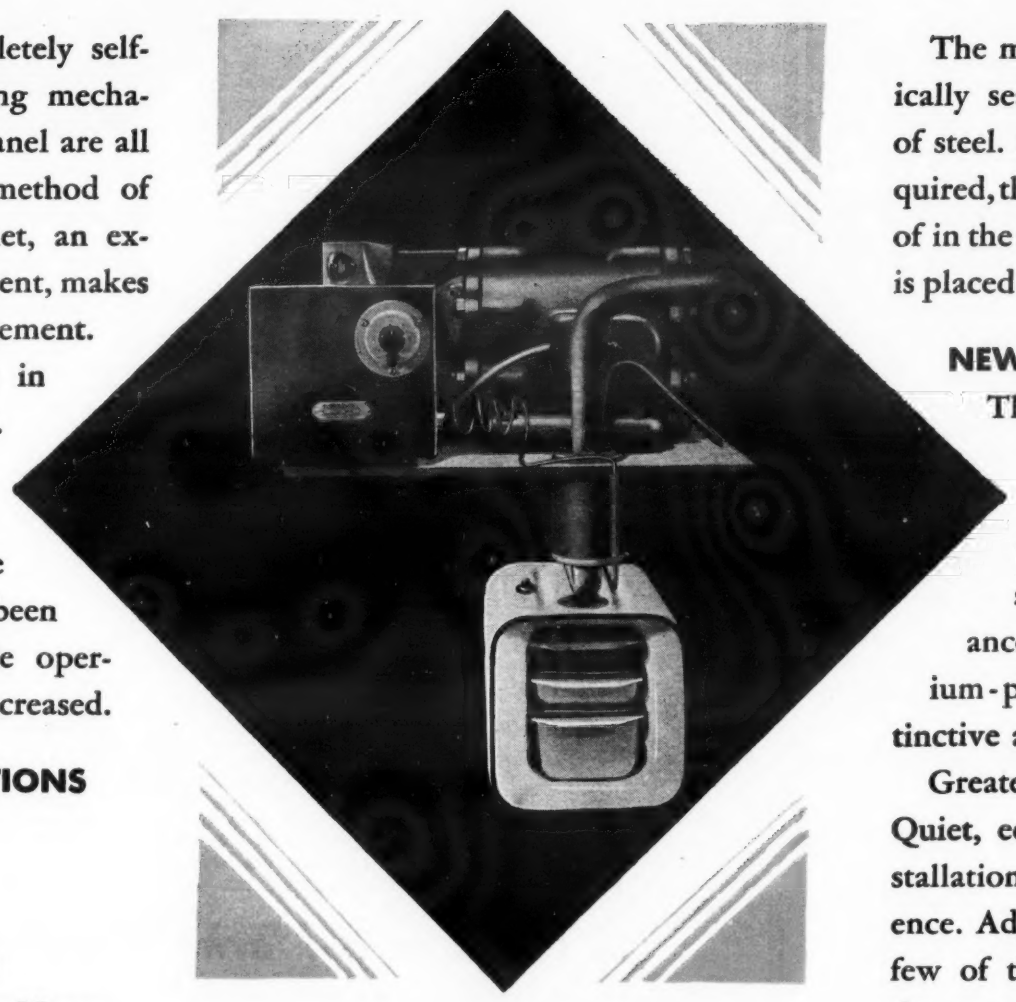
Springfield, Mass.—Several changes have been made in appointments and personnel of the local Frigidaire Sales Corp. branch, of which B. L. Simmons is manager. Ralph Golt, formerly traveling auditor for Frigidaire Corp., Dayton, Ohio, is now office manager. R. C. Nooney, former salesman of the local branch, is now in charge of the educational department; Charles Bappler, who was in charge of that department, is now head of household salesmen.

New REFRIGERATOR . . .

THE FREEZING UNIT IS SMALL, COMPACT, LIGHT-WEIGHT AND REMARKABLY EFFICIENT

The Westinghouse is a completely self-contained refrigerator. Freezing mechanism, evaporator and control panel are all attached to one base. The method of placing the unit in the cabinet, an exclusive Westinghouse development, makes possible this compact arrangement.

The complete unit is light in weight. Two men can install it. No special equipment is required. Non-essentials and troublesome machinery have been eliminated. Weight has been reduced to a minimum, while operating efficiency has been increased.



CONDENSED SPECIFICATIONS

1. Hermetically Sealed Unit
2. Fan-cooled Condenser
3. Positive Splash Lubrication
4. Complete, Compact Control
5. Simple Split-phase Induction Motor
6. Reciprocating Compressor
7. SO_2 Dry System
8. Factory Repair Service
9. Two-Year Warranty

AN HERMETICALLY SEALED DUST-PROOF MECHANISM

The Westinghouse freezing mechanism is located in the top compartment of the cabinet. It is located there because heated air rises. With the Westinghouse unit, the heat is thrown into the air above the cabinet.

The motor and compressor are hermetically sealed in a dirt and dust-proof case of steel. If, due to damage, repairs are required, they are made at the factory instead of in the home. A permanent supply of oil is placed within the unit before it is sealed.

NEW BEAUTY MEANS MORE SALES

The new Westinghouse Refrigerator is truly beautiful. It is "The Refrigerator with the lines of fine furniture." Its gleaming white surfaces, rounded corners, balanced design and artistic chromium-plated hardware give it a distinctive appearance.

Greater shelf area. Large ice capacity. Quiet, economical operation. Simple installation. Freedom from radio interference. Adjustable shelf space. These are a few of the many advantages built into the new Westinghouse Refrigerator.

Only a few distributors and a limited number of dealers will be in on this tremendous sales opportunity in 1930. A copy of the complete sales plan will be sent to distributors and dealers east of Chicago and north of the state of Virginia. All communications will be answered. Such inquiries will, of course, be held in the strictest confidence.

THE WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
REFRIGERATION DEPARTMENT MANSFIELD, OHIO

Westinghouse

Westinghouse Introduces Novel Features In Design

SPENCER DISC USED IN RELAY WHICH PROTECTS MOTOR

(Concluded from Page 10, Column 5)

this with the disadvantages of neither. The Westinghouse construction employs a magnetically driven fan which cools a small finned tube condenser. This fan drive takes its power from the main motor, and instead of drawing 30 to 35 watts, as does a separate fan motor, draws but 5 watts. In addition, it is very simple and reliable, having no fine conductors to burn out or break, no brushes to spark and cause radio interference, and no windings to become oil saturated and fail, due to the deterioration of the insulation.

Its construction is simple. Mounted on the main motor shaft are a pair of permanent magnets. These magnets rotate inside of a non-magnetic steel shell which forms part of the wall of the motor compressor casing. Outside of this cup-shaped shell, there is a group of steel fingers projecting through some aluminum rings. These fingers and rings constitute the fan rotor which is mounted on one end of the fan shaft. the fan being on the other. As the main motor rotates, the magnets rotate. pulling along after themselves, but at about 200 r. p. m. slower speed, the steel fingers and aluminum rings that drive the fan. The action is similar to that in a polyphase induction motor.

This simple, efficient fan allows forced air circulation over the condenser, compressor and motor, allowing a hood to be placed over the unit, thus materially improving its appearance in addition to greatly improving its performance.

There is probably more variation in details of evaporator construction among domestic refrigerators than in any other part. The methods of regulating the flow of refrigerant fall into three classes: high side float, low side float, and expansion valve. Westinghouse employs the latter.

The Westinghouse evaporator employs two shells, an inner one that forms the freezing compartment, and an outer one that serves as a radiating surface for cooling the box. The two shells are welded together at their front edge, and all of the exposed surface of the evaporator is white vitreous enameled, which provides a sanitary and readily cleanable finish.

The tubes in which the refrigerant evaporates are solidly brazed to the inner shell, giving that intimate thermal contact so necessary for rapid ice freezing. In order to expedite the freezing of ice in those trays not in contact with the bottom, heavy aluminum shelves are provided which convey the heat from the water to the walls of the evaporator. These shelves are easily removed for cleaning. The space between the shells is filled with a light oil that gives the evaporator considerable thermal storage, rendering the starting and stopping of the machine infrequent.

Probably the most rugged and by far the most widely used type of control is the pressure operated type. This is the one employed by Westinghouse. A small bulb is mounted against the external surface of the evaporator. This bulb is connected to a bellows in the control which contains sulphur dioxide. As the evaporator temperature changes, the corresponding pressure change is communicated to the bellows in the control, which serves to start and stop the motor and thus control the temperature of the evaporator and cabinet.

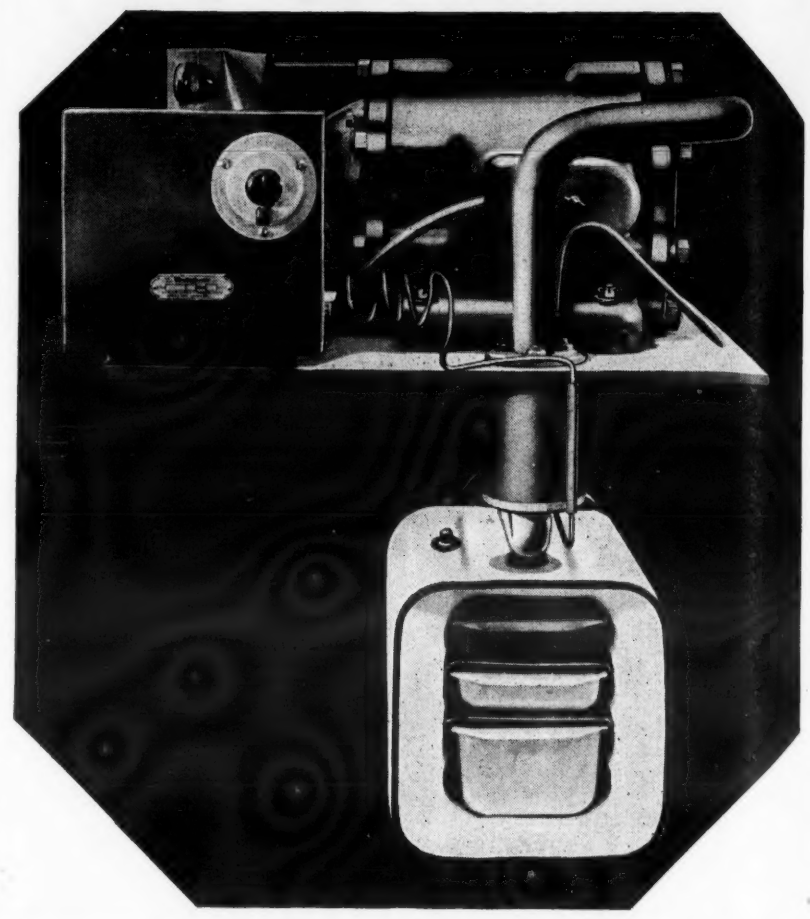
The motor being split phase, it is necessary to connect the starting winding in the circuit during starting. This is accomplished by a small relay in the control box.

In order to allow the motor to start under light load, a magnetically-operated valve is employed. This valve opens while the motor is starting. It allows the gas in the cylinder to bypass into the low pressure side of the system while it is open. This valve is instantaneous in its action, opening as soon as the motor attempts to start. This effective by-pass valve allows the motor to start under very low voltage conditions.

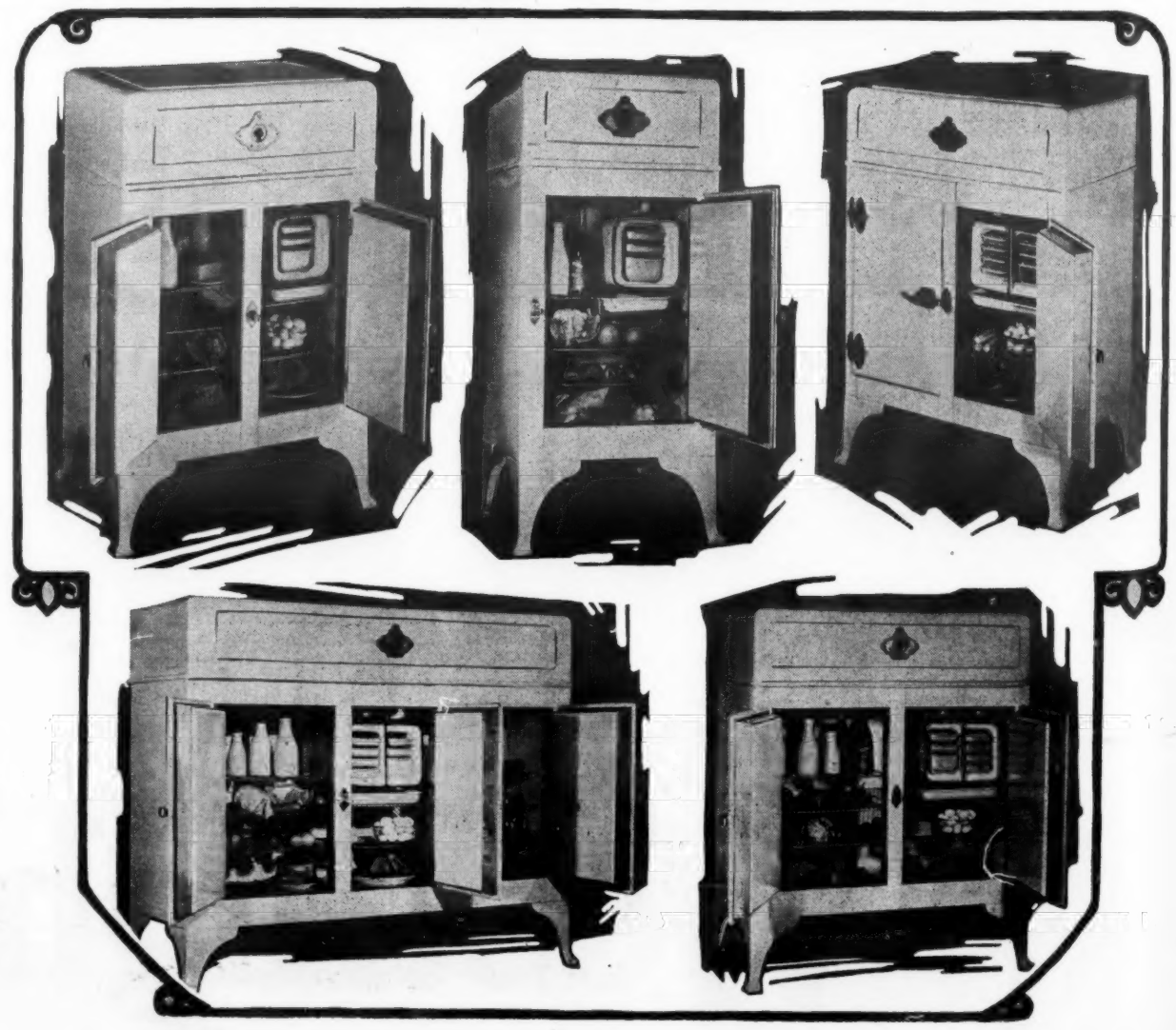
In order to protect the motor in case of failure of the starting mechanism, or due to any other cause, an automatically resetting thermal relay is employed. This relay employs for its main thermal element the well known Spencer disc that has been used so widely in Westinghouse automatic irons and other heating devices.

The disc is mounted in the side of the motor housing where it is affected by the motor temperature. In addition it has in it a diminutive heater connected in series with the line. This heater heats up due to current overloads and causes the Spencer disc to open, thus breaking the circuit. Excessive motor temperature also causes the disc to open the circuit. As soon as the motor cools down, the disc closes the circuit. This automatic reset feature is valuable, as it prevents the permanent shutting off of the refrigerator because of a temporary trouble, such as power supply interruption causing line voltages below the possible starting voltage or running voltage of the machine.

Westinghouse Mechanism



Uniformity Marks Westinghouse Cabinets



GOVERNMENT SURVEY OF WORLD MARKETS

Reports Show Gradual Spread of Demand for Refrigeration

Poor Economic Conditions and Low Standards of Living Limit Sales in Many Countries

WASHINGTON, D. C.—The tremendous growth of electric refrigeration industry during the past few years is reflected in export figures compiled by Electrical Equipment Division, Department of Commerce, and by recent foreign refrigeration market reports supplied by the Consular Service of the Department of State.

Export figures reveal that 22,588 electric refrigerating sets, with capacities up to 1 ton, valued at $3,684,981, left the United States during 1927. These figures were nearly doubled during 1928, when 35,712 sets, having capacities up to 1 ton and a valuation of $6,469,179, left American ports.

Marshall T. Jones, Chief Electrical Equipment Division, comments on the fact that while electric refrigeration has been available for domestic purposes during the past twenty years, it has shown its most pronounced growth only during the past decade. Benefits of refrigeration are now becoming widely recognized. Mr. Jones continues by saying that improved designs, reliability, long life, accessible service, economical operation and low prices of original equipment, made possible by mass production methods, are responsible for this extensive growth of the refrigeration industry.

Effect of Climate

While climate somewhat affects refrigeration, it appears to do so according to the law of inverse proportions. That is, countries having cold climates often offer a larger and more profitable market than countries having warm climates. Mr. Jones' explanation of this situation is that the cold climate generally have certain seasons that require artificial preservation for various foodstuffs, while inhabitants of warm climates have developed a tendency toward vegetarianism, foodstuffs of which do not require intensive preservation. He explains that refrigeration has, until recently, been unknown in tropical zones and inhabitants, for many generations past, have never considered it a necessity.

The following chart gives weather and temperature conditions in various important countries of the world. Temperature zones of 10 degrees variation were used in making up the table. The extreme of the zones encountered in each country are taken for the ranges. Thus, a point at which the monthly mean ranges from 43 to 68 degrees is given as having a range of from 40 to 70 degrees. Rainfall is similarly measured in 10-inch zones. Climatic variations are due mainly to altitudes along the tropical west coast of South America, the difference between seasons not being great. The very narrow coastal strip is hot throughout the year, but includes only a very small percentage of the territory of these countries.

COUNTRIES	Summer	Winter	Range of Mean Temperatures: Monthly	Annual	Mean Annual Rainfall
					Inches
NORTH AMERICA—					
Alaska	Cool	Cold	10– 60	0–50	0– 80
Canada: South	Warm	Cold	0– 80	40–70	10– 80
Central America	Hot	Hot	60–100	80–90	20–120
Mexico	Hot	Cool	30– 90	50–80	0– 80
United States:					
North	Hot and warm	Cold	20– 90	50–70	20– 60
South	Hot	Cool	30– 90	50–80	0– 80
West Indies	Hot	Hot	70–100	70–90	20– 80
SOUTH AMERICA—					
Argentina	Hot	Cool	30– 90	40–90	40– 60
Bolivia	Hot	Cool	70– 80	0–60	.....
Brazil	Hot	Hot and warm	60– 90	70–90	0– 80
Chile	Hot	Hot and warm	30– 70	40–70	0– 80
Colombia	Hot	Hot	70–100	80–90	80–120
Ecuador	Hot	Warm	70– 90	70–90	0– 80
Paraguay	Hot	Warm	60– 90	70–80	10– 40
Peru	Hot	Warm	60– 80	60–80	0– 80
Uruguay	Hot	Warm	50– 90	60–90	20– 60
Venezuela	Hot	Hot	70–100	80–90	40–100
EUROPE					
Balkan States	Hot and warm	Cool and cold	30– 90	50–70	40– 80
Baltic States	Warm	Cold	10– 70	30–50	10– 40
British Isles	Warm	Cool	30– 70	40–60	40– 60
Central States	Warm	Cool	20– 80	40–60	10– 60
Latin Europe	Hot	Cool	30– 90	50–70	10– 80
Scandinavia	Warm	Cold	10– 70	10–50	10– 60
Russia	Warm	Cold	0– 80	20–60	0– 40
ASIA—					
China	Hot	Cool	10– 90	30–90	0– 80
Malay Peninsula	Hot	Warm	70– 90	70–90	80–120
OCEANIC—					
Australia (excepting arid region of north)	Hot	Warm	50–100	60–80	10– 30
AFRICA—					
Algeria	Hot	Hot	50–100	60–80	10– 30
Sahara	Hot	Hot	50–100	70–90	0– 20
Sudan	Hot	Hot	60– 90	70–90	0–160
South Africa	Hot	Warm	50– 90	60–90	20– 80

Electricity is available in practically every corner of the earth where articles in the price class of refrigerators might be sold.

The following reports, extracted from communications sent to the Department of State, by United States consuls, show the attitudes of foreign markets toward electric refrigeration:

Island Countries

Barbados—Consul Wm. W. Brunswick, Barbados: "High price of electricity has hindered sales in the island, but a drastic reduction, from 30 to 10 cents per kilowatt hour, with discounts, will undoubtedly increase the sale of electric refrigerators."

Bermuda—Consul Robertson Honey, Hamilton: "There is a considerable demand for electric refrigeration, and United States is the principal source of supply."

Cuba—Consul General L. J. Kenna, Havana: "Cuba has developed a potential market for units, importing 22,233 between 1922 and 1928. An economic depression, due in part to low sugar prices, caused a decline in the number of refrigerators imported during the past two years. Four American-made machines are now marketed in Cuba, no other makes being offered."

Haiti—Consul William B. Lawton, Santo Domingo: "A shortage of electricity. Purchasing power of 85 per cent of the population is limited."

Jamaica—Consul Jose de Olivares, Kingston: "Insufficient, expensive electricity, and the fact that Jamaica is chiefly agricultural, hinders extensive use of refrigeration. A preference is shown toward American-made units, and a stock of refrigerators is carried by a local power company."

Trinidad and Tobago—Vice-Consul Alfredo L. Demorest, Trinidad: "A small market for electric refrigeration; excessive cost of electricity and low purchasing power of inhabitants are two handicaps that the industry will have to overcome."

Netherlands West Indies — Consul Thomas W. Voetter, Curacao: "The present is a good time for manufacturers of refrigeration to establish agents on islands. Electricity now is supplied only during the night, but power company soon expects to furnish current 24 hours a day."

Netherlands East Indies—High cost of electricity and low cost of ice throughout the islands handicap electric refrigeration. A number of American-made units are on the market, but sales have been slow.

Canary Islands—A demand for electric refrigeration might be built up in the islands; there are several installations working at the present time. The demand is confined to a few hotels and large homes.

Central America

Costa Rica—Consul Thomas J. Maleady, Port Limon: "The market for almost any imported article is restricted, but a few foreigners and well-to-do local families might become refrigeration prospects."

Guatemala—Consul General G. K. Donald, New Guatemala: "Considerable refrigeration is used here, in spite of expensive electricity. Refrigeration is useful during the heat of midday."

Nicaragua—Consul Christian T. Steger, Corinto; **Panama**—Vice-Consul H. D. Meyers, Panama; and **Salvador**—Vice-Consul S. L. Wilkinson, San Salvador: "Poor prospects for electric refrigeration, due to low purchasing power of the large majority of inhabitants. Insufficient current and the fact that the countries are agricultural also handicap refrigeration."

Mexico—Vice-Consul Ellis A. Bonnet, Durango: "Revolutions have disabled many power plants in northern Mexico, thus handicapping the use of refrigeration. American capital is being invested in power plants now, however, and a market for electrical appliances will probably develop."

Consul Raleigh A. Gibson, Guadalajara: "Demand for electric refrigeration is limited at the present time, but purchasing power of inhabitants here is higher than the average purchasing power of remainder of Mexican population. Twenty or thirty units have been sold and there is a small market."

Consul General William Dawson, Mexico City: "Demand for electric refrigerators is not extensive as yet, but is growing rapidly, mostly among foreigners and well-to-do families. Two or three refrigeration companies are now located here."

Consul Peter H. A. Flood, Tampico: "Refrigerators are used in practically all the better class homes, and electric units are gaining in popularity. Approximately 175 units are in use here at the present time. Several American firms are on the market, and competition is keen in spite of the fact that the purchasing power of a large percentage of the inhabitants is limited. Refrigerators are sometimes sold on the installment plan but are seldom rented. Most Mexican firms do not care to deal with U. S. commission merchants, prefering to deal directly with manufacturers or manufacturers' agents already established in Mexico."

Vice-Consul Willys A. Myers, Vera Cruz: "American manufacturers have canvassed this territory for the past three years. A number of householders in this city have installed units and obtained satisfactory results from them. Low buying power of populace, however, limits refrigeration market."

South America

Argentina — Vice-Consul S. Walter Washington, Buenos Aires: "Electric refrigeration is gaining popularity in Argentina. Hotels, meat markets, cafes, bars, restaurants and clubs offer the best field at present, as domestic refrigerators have not yet been in demand. A rough estimate shows that about half the units now in use here are American types, while the other half is divided between British and German makes."

Bolivia—Vice-Consul Edward G. Trueblood, La Pas: "Living standards are much lower than those in United States, and the inhabitants are not educated to the point of accepting refrigeration. Low purchasing power is another handicap."

Brazil—Consul Nathaniel P. Davis, Pernambuco: "Much educational work must be done in the northern part of Brazil before refrigeration is accepted as a household necessity by the mass of inhabitants. Butter, lard, and other perishables are generally sold in tin cans, only a small proportion of middle class homes have refrigerators. Daily purchasing is the rule."

Consul C. R. Nasmith, Porto Algegre: "Poor economic conditions and low living standards prevail in southeastern Brazil. German and American units are now on the market, with sales favoring the latter makes. Conditions just south of Porto Alegre are much better, however; educational work is showing the inhabitants the need of refrigeration, and good prices for coffee, which is the chief export product, are permitting a fair standard of living."

Consul Fred D. Fisher, Santos: "Electric refrigerators on sale here are all American and British makes, a local preference is shown for the American line. Sales methods employed by distributors are similar to those used throughout the United States; much advertising is utilized."

Consul C. R. Cameron, Sao Paulo: "Refrigerators are becoming popular here on account of comparatively low

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cost of electricity; they are already being sold to a fair extent and show promise of increased sales. Good prices for coffee, which is the chief export, are permitting a good standard of living." the latter makes."

British Guiana—Vice-Consul Harold R. Brown, Georgetown: "Low sugar prices are a present handicap to the electric refrigeration market here. The 1928 drop in diamond production also contributed to the present business depression."

Chile—Consul General C. F. Deichman, Valparaiso: "Until a year and a half ago electric refrigeration was unknown in Chile, but today there is a rapidly growing market. More than 200 refrigerators were imported during 1928, all American-made products. While this is not a large number, it is important in view of the fact that Chileans have, in the past, exercised a national prejudice against chilled foods."

Vice-Consul Sidney H. Browne, Antofagasta: "Surrounding territory is desert region, sparsely populated, and the majority of the inhabitants are laborers, with limited purchasing power, unable to afford electric refrigeration. Hotels in Antofagasta are small, poorly operated and lack modern equipment. There are about 15 electric refrigerators being used here at the present time. Two makes of units are sold, both American manufactured. Installment buying is used to a large extent."

Vice-Consul Edwin Schoenrich, Arica: "There is apparently no market for electric refrigeration in this province at the present time."

Vice-Consul Camden L. McLain, Concepcion: "There are several refrigerators used in clubs and hotels, but they are used as a convenient storage, rather than for refrigerating purposes, due to mildness of climate."

Consul Robert R. Bradford, Iquique: "Low purchasing power and lack of familiarity with refrigeration of any kind are responsible for the fact that there is not a single electric refrigerator in the town of Iquique. Four or five units, however, are used in nitrate plants in the interior."

Ecuador—Vice-Consul N. Allen Rhode, Guayaquil: "Few towns in Ecuador, situated on the hot tropical coast, possess electric service, but electric refrigeration might be sold on the local market, which does have access to current. Living conditions are low and the average purchasing power, as compared with that of an American citizens, is 1 to 12."

Paraguay—Vice-Consul John B. Faust, Asuncion: "There are some 50 electric refrigerators being used in Paraguay at the present time. The market might possibly be developed if the inhabitants could be educated to the use of refrigeration."

Peru—Consul George A. Mackinson, Callao-Lima: "There is not a large market for electric refrigeration here. Four types of units are now sold, two American, one German and one Swiss. People in Peru do not consider refrigeration a necessity, as purchasing is done daily."

Uruguay—Vice-Consul Nathan Scarritt, Montevideo: "Electric refrigeration was unknown in Uruguay until about three years ago, when several American companies entered the field. At present there are some half dozen American types, besides two European, on the local market; United States manufacturers get about 90 per cent of the total sales. During 1928 more than 400 units were sold. Ice cream cabinets are becoming popular also, thirty-odd units being sold during the past year."

Venezuela—Vice-Consul Jay Walker, Maracaibo: "The first electric refrigerators were imported here during 1927. Since then there has been a steady demand for them in homes of the wealthier class. Venezuela is enjoying a wave of prosperity and the market for refrigeration is favorable. American, German, and French companies are competing on the active market."

EUROPE

Albania—There are no electric refrigeration dealers in Albania and, as far as is known, there is not a single unit in the country. High cost of electricity and low purchasing power of inhabitants have placed refrigeration out of reach of the average citizen.

Belgium—Edward E. Silvers, Antwerp: "The demand for electric refrigeration at the present time is restricted to wealthy and middle classes, cafes and hotels. Economic conditions are good, poverty is practically unknown."

Consul William C. Burdett, Brussels: "Data obtained from principal firms engaged in local trade shows that about 3,200 units have been sold here during the past three years. One American and one Swedish firm share about 80 per cent of the total sales between them. Apartment houses are now being constructed and will probably provide an outlet for domestic refrigerators, which have not had as great a demand up to this time as the commercial units."

Bulgaria—Vice-Consul Samuel Green, Sofia: "There is not an electric refrigerator in Bulgaria. The population is 85 per cent peasant farmers, who live in more or less primitive manner."

Czechoslovakia—Commercial Attache K. L. Rankin, Prague: "An American firm has built up a considerable market for electric refrigeration here."

Independent City of Danzig—Consul Edwin C. Kemp: "There is only a small market for electric refrigeration here; one American and two German firms are now competing on the active market. A few of the larger hotels and two butcher shops have installed units."

Denmark—Consul General North Winship, Copenhagen: "Much has been done in recent years to educate the Danish public to the advantages of refrigeration. One American firm is doing a good volume of business in Denmark and dominates the market, in spite of competition from a Danish manufacturer of small domestic units."

Finland—Consul James R. Wilkinson, Helsingfors: "The sale of refrigerators in Finland justifies the statement that a market exists for these units. All that is apparently necessary is effective sales methods and advertising. An American and Swedish make of machines are now marketed here."

France—Consul Lucien Memminger, Bordeaux: "The present demand for refrigeration appears to be increasing in this consular district. Most of the sales of commercial units have been made to meat shops, cafes and hotels. The greatest difficulty in making sales to prospective French customers is to convince them that greater economy and better service will be obtained by installing a refrigerating unit. Nearly all milk used in Bordeaux is distributed daily; most butcher shops are small and do not keep large supplies of meat on hand; nearly all perishable foodstuffs are disposed of daily, and little refrigeration has been used up to this time. Several French, two American and one Swedish company are represented in Bordeaux and Toulouse by agents. Refrigeration equipment is sold through manufacturers' agents, who are given exclusive territory. Usual credit terms are 30, 60 and 90 days."

Consul James G. Carter, Calais: "Average purchasing power is restricted, about 90 per cent of the population being of the working class. Butcher shops, many of which do a wholesale business, appear to be the most likely prospects for refrigeration."

Consul Samuel Hamilton Wiley, Cherbourg: "Household refrigerators are practically unknown here."

Consul Lester Maynard, Havre: "An American-made machine is competing with a French unit manufactured here. Electric refrigeration is considered a luxury and not an economic need throughout this district."

Consul Harold Playter, Lille: "Large refrigeration units are in great demand in this industrialized district. Breweries, abbatoirs, dyeing plants connected with the textile industry, storage plants and other establishments are installing electric refrigeration, but the demand for small domestic units is slight as compared with that of United States. Butcher shops, bakeries and restaurants are also using a large number of commercial units; American-made machines lead the market in the Lille district, installing 90 per cent of the total sales."'

Consul Hugh H. Watson, Lyon: "There are 600 butcher shops here and only about 100 of them have refrigerating machines. Most units sold in Lyon are of French origin; two American makes are also marketed. Housewives generally buy foodstuffs in small quantities, thus cutting the need of refrigeration to a considerable extent. Ice is difficult to obtain and that is a factor favoring the electric unit."

Consul John A. Ganson, Marseilles: "There is a growing demand for electric refrigerators in the south of France. This demand is at present supplied by two American makes and Swedish Electrolux. Firms operating as agents sell on a commission basis."

Consul Otis A. Glazebrook, Nice: "There is a good market for refrigeration here; an American firm has been selling successfully throughout the district. The district of Nice offers as good a field as any in France for the sale of refrigerators, because of the large number of wealthy people who have villas here. There is no local preference for any particular type of machine."

Consul George Orr, Paris: "Two American concerns are actively represented here, and a third will soon market its product. From 80 to 85 per cent of the installations in Paris are of American, Swedish or Swiss manufacture. The market is good."

Consul John D. Johnson, Strasbourg: "Interest in refrigeration is limited because it has never been used to a great extent. The climate is not particularly warm, summer season is short, and economic conditions are such that refrigeration is practically a luxury. The demand for electric refrigerators is confined almost entirely to eight or ten of the larger cities in the Strasbourg district."

Germany—Consul General C. B. Hurst, Berlin: "Germany presents a fairly attractive market for American refrigerators. They are meeting with ever-increasing favor, and are regarded as the standard of excellence. The use of electric refrigerators has been developed in Germany only since the war. German housewives, like French, buy perishable foodstuffs daily. High price of electricity in certain sections of Germany and the small percentage of wired homes, limit the present development of refrigeration. It is estimated that one out of every 500 families in Germany uses electric refrigeration. The general economic situation in Germany is good, in spite of high interest rates, and the market is thought to be favorable for further introduction of American products. It is estimated that from 50 to 55 per cent of the units sold are of American origin, the remainder German. The large majority of American firms doing business in Germany grant exclusive agencies to firms located in either Berlin or Hamburg, with permission to establish regional sub-agencies in other parts of the country, when conditions warrant them. The system of installment payments for refrigerators and other expensive equipment is now in general use throughout Germany."

Consul Leslie E. Reed, Bremen: "Local dealers state that the use of electric refrigerators has increased considerably during recent years, and that there should continue to be a steady demand for these products, provided prices are sufficiently attractive to enable many small and medium-sized firms, which have up to this time used the old-fashioned ice chests, to purchase electric refrigerators. American units have been extensively advertised locally. There are several makes of German refrigerators and ice machinery sold here, as well as American; the latter are selling in considerable quantities, due to the fact that their prices compare favorably with those of German units."

Consul Lester L. Schnare, Breslau: "There appears to be only a comparatively small demand for electric refrigerators. An American firm sold 100 units during 1928, but it is doubtful whether all the other firms represented here sold as many as the one American company. Several German companies have entered the market with machines in competition with the American units. Low standards of living, however, limit the number of potential buyers in the Breslau district."

Consul J. Klahr Huddle, Cologne: "Considering size, wealth, industrial and business activities, this district is obviously an important market for refrigerating machinery. A radical change has taken place in refrigeration since the war, and units are now favored. The demand for refrigeration in homes and apartments has been small, but the number of commercial refrigerators placed in shops has been comparatively large. Cologne has an important electric refrigeration industry of its own, but two American machines are represented and it is reported that their business has been satisfactory. Several amalgamations of German manufacturers were carried out during 1928, which implies that the more important firms are combining their forees to combat foreign competitors."

Consul G. Bie Ravndal, Hamburg: "The local market presents a demand sufficient to warrant the maintenance of small stocks of American equipment. In spite of the fact that German refrigerators are much cheaper than American, the few American firms are doing a worth-while business in Hamburg. Best business practices are to establish exclusive agency arrangements."

Consul F. Van den Arend, Leipzig: "Despite mild climate and rather low average temperature, refrigeration is being used in an increasing extent for commercial and household purposes. Imported American units dominate the Leipzig market. Small and medium-size refrigerators, ranging from five to twelve cubic feet storage capacity, are enjoying the best sales at present."

Consul John E. Kehl, Stuttgart: "The demand for electric refrigeration is relatively new in this territory, but it is growing, due to the inadequacy and high price of ice. Households using electricity fairly extensively pay an average of about five cents per kilowatt hour. American units were first on the market, and are generally preferred. German refrigerators are sold directly from manufacturer to retailer."

Greece—Consul Edwin A. Plett, Athens: "Electric refrigerators have only recently been introduced on the local market. Several American makes are being offered, in addition to two Swiss and one German. One American dealer here has disposed of approximately 100 units over a three-year period; the demand is increasing and the market is expected to expand in the near future. Two factors that might handicap expansion of refrigeration are the low value of the drachma, Greek unit of currency, and the fact that the country's population is predominantly devoted to agriculture and pastoral pursuits. The Athens market is highly competitive."

Consul Charles J. Pisar, Saloniki: "Refrigerators are practically unknown in this district; the earning power of the people is at present so low that they cannot afford refrigeration. The supply of electricity is inadequate to cope with even lighting requirements. Foreign companies are gradually building power plants, however, and a market for units might be developed."

Hungary—Vice-Consul John H. Morgan, Budapest: "A demand for electric refrigeration has been created here. Besides American products represented on the market, there are units by Ascher Wyss & Co. (Swiss), German "Audifren" Rota, Linde and Bayerische Augsburg and Dutch Codova."

Italy—Consul Leon Dominian, Rome: "Electric refrigeration was only recently introduced here, but appears to be gaining rapidly in popularity. The sales are limited, however, because of prevailing high retail prices. The largest de-

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mand for refrigerating machinery appears to be among the bars, cafes, restaurants and hotels that specialize in tourist trade. There are no manufacturers of refrigerating machinery in the Rome consular district. With increased knowledge of food sanitation in Palermo and Sicily, the demand for refrigeration during the summer months is rapidly increasing. A few wealthy families have installed electric refrigeration, but the cost of these units prohibits their general use, as the purchasing power of the middle class is very limited. American, Swedish, Italian, and German units are on the local market. The clientele for electric refrigeration in the city of Trieste is found among ships, hotels and butcher shops; middle class merchants cannot afford it."

Latvia—Consul A. W. Klieforth, Riga: "Mechanical refrigeration in households is practically unknown here. Winters are long, summers short, and river and lake ice is abundant."

Netherlands—Consul General Charles L. Hoover, Amsterdam: "Domestic refrigerators are used only in the wealthier homes. In large establishments, such as cold storage warehouses, abbatoirs, etc., complete refrigerating machinery has been installed. During the three years that electric refrigerators have been on the market, nine different makes have been competing for trade—four American, two Dutch, one Swedish and one Swiss. Less than 5¾ per cent of Netherland's 7,500,000 population pay taxes on incomes greater than two thousand dollars. Dutch homes are not wired heavily enough to stand the added load of a domestic unit."

Consul Carol H. Foster, Rotterdam: "Electric refrigeration in Netherlands is still in the pioneering period; a small increase in demand is almost certain. American units are well liked here and at least two are being successfully sold. There are several domestic factories engaged in manufacturing large refrigerating machinery; none, however, produce small units. Economic conditions are favorable for trade."

Norway—Charles E. Worman, Bergen: "Refrigerators have recently been installed on a small scale in private homes, large hotels, groceries and meat markets. In view of the fact that electricity is reasonably priced, and as a result of a strong campaign for sanitary storage of food products, now being carried on, there is every possibility that a more active demand for electric refrigeration will develop. Norway has her own manufacturers of refrigerators. American and Swedish units are marketed here; 25 were sold in 1927, and 33 during 1928. Dealers state that the demand for refrigeration is gradually increasing from year to year."

Poland—Electric and gas refrigeration has recently been introduced here, but has been installed in only a few of the larger households in Warsaw.

Portugal—Consul General Samuel T. Lee, Lisbon: "The Portuguese public, as a whole, has not been educated to the use of refrigeration; many butcher shops do not use even ice boxes."

Consul W. J. Yerby, Oporto: "There appears to be a rather good undeveloped market here for electric refrigeration, especially in the fish trade. Electricity is plentiful and comparatively cheap."

Rumania—Consul J. Rives Childs, Bucharest: "Three American firms are represented here and are well established in business. The pork industry, dairy business and fish markets offer prospective outlets for electric refrigeration."

Spain—Consul H. A. Doolittle, Bilbao: "The demand for electric refrigeration, which was almost non-existent two years ago, has been rapidly increasing in this consular district. There is a possibility of from ten to twelve sales per month of household units alone, and clubs and co-operative grocers are now studying commercial refrigeration. Three American makes and one Swedish are on the present market."

Consul, M. L. Stafford, Madrid: "Cities and towns of Central Spain should offer a promising field for electric refrigeration, and while the demand for it is apparently growing, the market, as yet, is relatively small compared with population and climatic conditions. United States supplied approximately 90 per cent of the units now in use here. Small and medium-sized electric refrigerators are in great demand for both home, cafe and hotel use. As a general rule, electric refrigerators are handled by agents who, under their contracts, have exclusive territorial rights."

Consul, Walter H. McKinney, Vigo: "The demand for electric refrigerators is small; not more than four or five are now being used."

Sweden—Consul H. C. von Struve, Goteborg: "The demand for refrigeration is constantly growing, and it has become common to equip large apartment houses and some of the smaller ones with units. Large dairies appear to use either Danish or Swedish refrigerating machinery. Refrigeration trade is well canvassed at present by a Swedish concern and by well established American, German and Danish manufacturers. Units are sold locally by firms generally acting as sub-agents for head agencies located at Stockholm. The ready supply of fresh water ice tends to limit the demand for artificial refrigeration."

Switzerland—Consul Calvin M. Hitch, Basel: "Three or four Swiss firms manufacturing electric refrigerators control the local market, although there are American and Swedish companies represented. Refrigeration has been accepted in Switzerland because electricity is available because the living standard is one of the highest on the Continent. one of the highest on the continent. Units of foreign manufacture being sold in Basel are handled by agents who have been given exclusive rights for certain territories."

Consul, Elbridge D. Rand, Geneva: sented in Switzerland. There have been some unfortunate occurrences with American units here, probably due to insufficient technical knowledge of the local staff. These have caused the local public to maintain a reserve toward American products, and Swiss competitors have thus been benefited."

Consul General Lewis W. Haskell, Zurich: "The first electric household refrigerators on the Swiss market were of American origin and they still regulate it to a certain extent in spite of the fact that inhabitants are partial to domestic-manufactured machines. Many apartments, hotels and homes have installed units."

Great Britain and **Ireland**—Consul General Thomas D. Bowman, Belfast: "There are approximately 200 refrigerating units, domestic and commercial types, operating in this territory. They have been installed during the past few years. Ninety-five per cent of this number are American products. Two American firms and one Swiss are represented on the local market. Lack of electricity and the fact that warm weather is limited to about seven days a year, hinders the expansion of electric refrigeration industry in Ireland. Representation is by sub-agencies depending upon London branch distributing depots of the manufacturer; item lots are supplied as required. Economic conditions are poor at the present time, due to poor linen markets."

Consul General Albert Halstead, London: "Although progress has been made in electric refrigeration, the shop equipped with a modern unit is still an exception. The existing demand for domestic refrigeration is confined to the wealthy class, as purchasing power of inhabitants is small, more than 1,400,000 persons having been unemployed throughout the past several years. Refrigerators now being installed are generally of large capacity. Two American makes of electric refrigerators set London market standards."

Yugoslavia—Consul W. Perry George, Belgrade: "Expensive electricity and high freight rates hinder the introduction of electric refrigeration here."

Aden—Vice-Consul Cloyce K. Huston, Aden: "There is a great demand for refrigeration in this district, and both domestic and commercial units are being used, domestic models having the greater demand. Inhabitants use large quantities of ice and a big saving is effected with electric units."

ASIA

Colombo—Consul Stillman W. Aells, Ceylon: "Several makes of electric refrigerators are marketed here, but their price is so high that sales are not large. Foodstuffs are generally bought daily."

China — Consul John R. Putnam, Amoy: "The market for electric refrigeration is limited. It is confined to the small foreign community and the wealthier class of Chinese."

Consul General Douglas Jenkins, Canton: "It is doubtful whether electric refrigeration will be adopted here, even by Europeans, as they are generally only temporary residents. Chinese have established a prejudice against cold dishes. Two American companies are now represented in South China; one of these has installed over sixty units, the other only recently marketed its product. The agents for both refrigerator concerns carry stocks in Hongkong. The advantages of electric refrigeration in South China are obvious, however, because of the hot, humid climate during summer months."

Consul Walter A. Adams, Hankow: "There has been practically no demand for electric refrigeration. Several importers have expressed an opinion, however, that a market might be developed among Chinese. Several units have been placed in Harbin hotels and private families within the past year or two."

Consul M. S. Meyers, Mukden: "While the local market for electric refrigeration is considered worth while developing, it is doubtful if appreciable sales can be effected immediately. American-made refrigerators are now on the local market."

Consul General C. A. Gauss, Tientsin: "There are no American-made units on the market. Labor is cheap in China and poor economic conditions prevail, due in part to the unsettled condition of the government."

India—Vice-Consul William H. Beach, Bombay: "The rapid expansion of electric refrigeration industry in India during the past 18 months has been an outstanding feature in the import trade, and practically all of this trade is in the hands of American manufacturers. Three large United States concerns are operating in Bombay, two British manufacturers are also on the market with their units. Distribution is effected through a number of sub-agencies who handle the retail trade. Although the market is already well exploited, it is the opinion of manufacturers now in the field that the market has not yet been fully developed, especially with commercial units. Two factors limiting further immediate expansion of the industry in the Bombay district are the lack of available electricity and the limited buying power of the mass of inhabitants. Wood boxes are unsatisfactory in India because of the deleterious effects of the climate on them and the destructiveness of white ants, which are prevalent in India; they attack any sort of wood except native teak."

Consul General Robert Frazer, Jr., Calcutta: "The demand for refrigeration is chiefly among Europeans and Anglo-Indians, who number about 175,000 and 125,000, respectively. Three American-made electric refrigerators supply practically the entire Calcutta market."

Vice-Consul H. B. Osborn, Rangoon: "The percentage of people using refrigerators in this district is very small. Europeans who come here remain for an average period of five years, and they buy the cheapest unit available."

Japan—Consul E. R. Dickover, Kobe: "There is a growing number of electric refrigerators being imported in this consular district, and there is a well-developed industry for the production of mechanical refrigerating plants."

Consul Leonard M. Green, Yokohama: "Though the market is restricted, a limited demand exists for refrigeration, and with the constant raising of living conditions among Japanese, and recognition of the benefits of electric refrigeration, it is certain that the market will be enlarged."

Palestine—Electric refrigerators are unknown in Palestine. It has been only in the past three or four years that electricity has been used generally throughout the country.

Australia—Vice-Consul Leo J. Callanan, Adelaide: "Several makes of American and Australian units are on the market, and there is a demand for them which will undoubtedly increase."

Consul Thomas H. Robinson, Melbourne: "There is a good potential market for electric refrigerators, as the summers are hot and long, and the winters are broken by warm spells of several days' durations. The first was pioneered by two American firms. Two British concerns and Electrolux are now on the local market, as well as two domestic companies manufacturing units."

Consul Agent H. A. Davies, Newcastle: "There is not a very big market for electric refrigerators in this consular district, chiefly due to their high cost."

Consul General E. M. Lawton, Sydney: "The demand for refrigerating machinery seems good. Meats are exported and storage for dairy products and fruit is required."

New Zealand—Consul Walter J. Boyle, Auckland: "Since the introduction of the household unit, the demand has increased and a fair sale has been enjoyed by distributors. American, British and Swedish companies are competing on the market. There is a growing demand for ice cream equipment here."

Algeria—Consul Oscar S. Heizer, Algiers: "A number of units have been sold and three companies are represented on the market, two American and one Swedish."

Egypt—Egypt was introduced to electric refrigeration several years ago, when American-made units were placed on the market. A few sales have been effected, but the high price of the units hinder a large market for them.

Ethiopia—Vice-Consul James L. Park, Addis Ababa: "Importation of refrigerating apparatus is impracticable at the present time, due to a lack of electricity."

Morocco — Consul General Maxwell Blake, Tangier: "The potential market for electric refrigeration is restricted entirely to the foreign element, as the native population lives from hand-to-mouth."

Union of South Africa—Consul General Ralph J. Totten, Cape Town: "There is a fair demand for electric refrigeration. Several units are marketed."

Vice-Consul C. H. Hall, Jr., Johannesburg: "Since the introduction of units into this district several years ago, electric refrigeration has made satisfactory progress when the limited market is considered. American companies have obtained about sixty per cent of the sales, Electrolux receiving the other forty."

Consul C. E. Macy, Port Elizabeth: "One American and one British company are competing on the market here, which has a limited demand for electric refrigeration."

These reports, furnished by Bureau of Foreign and Domestic Commerce, show that the biggest handicaps facing electric refrigeration in foreign countries today lie chiefly in poor economic conditions abroad, low standards of living, daily purchasing, lack of available electricity, and lack of education regarding the value of proper care for foodstuffs.

The Compressor Foundation

By L. Kay Wright
Mem. A. S. R. E.; Mem. A. S. M. E.

POSSIBLY one of the most neglected and sadly abused portions of a small unit installation is the concrete machine base. Any kind of sand, gravel and an indeterminate amount of cement and water, usually hastily mixed without regard to proper ratios—it is no wonder that the bases usually observed under small units are crumbly, cracked and in need of repair.

The perplexities incident to converting the dissimilar terms of bags, barrels and cubic yards of material, when estimating or ordering supplies for concrete work, may be eliminated by the use of the following table, the basis of which is the assumption that a bag of cement contains a cubic foot of material:

PROPORTIONS OF MATERIAL

Proportions of Material (or cubic feet)			Cu. Ft. of Concrete	Cu. Ft. of Material Required for One Cu. Ft. of Concrete		
Cement	Sand	Gravel	Produced	Cement	Sand	Gravel
1	1½	0	1.75	.57	.86	...
1	2	0	2.1	.48	.96	...
1	3	0	2.8	.36	1.08	...
1	1½	3	3.5	.29	.43	.87
1	2	3	3.9	.25	.50	.75
1	2	4	4.5	.22	.44	.88
1	2½	5	5.4	.19	.47	.90
1	3	5	5.8	.17	.51	.85
1	3	6	6.2	.16	.48	.96

The erectors should be instructed as to the method productive of the best concrete. The notes which follow indicate easy methods for estimating, and illustrate the advantages of careful work.

By multiplying the cubic feet of finished concrete desired by the cement factor given in the table, the quantity of cement will be obtained. Other quantities are found by multiplying this result by the terms of proportion.

For example, a certain installation requires 300 cu. ft. of concrete of the 1 : 2 : 4 mixture. The cement factor for this mixture is found to be .22, and by multiplying 300 by that factor the product will be found to be .66, giving the number of bags of cement required. For sand and gravel multiply by 2 and 4, as:

Cement required....66 cu. ft. (or bags)
Sand required = 66 x 2 = 132 cu. ft.
Gravel required = 66 x 4 = 264 cu. ft.

If it is desired to change the figures thus obtained by use of the table, the products being in cubic feet, divide by 27 to obtain quantities expressed in cubic yards.

Mixing Concrete

Only clean water should be used in making concrete. Water to be suitable for concrete work must be free from acid, alkali, oil, or any other impurity. Sea water should not be used.

In freezing weather it is best to use warm or hot water and heated materials, covering the poured or mixed mass with blankets of straw or cloth. Sometimes calcium chloride is mixed with the water to prevent the green concrete from freezing. This material tends to produce a bloom or white excrescence on the surface.

The 1 : 2 : 4 mixture is used for such work as beams, columns, floors, walls and general reinforced work; also for structures subjected to pressure, such as water tanks, swimming pools, water cooling ponds, conduits, sewers, bridges, foundations, bins for various materials, and silos.

The 1 : 2½ : 5 mixture is not waterproof and is used for sidewalks, floors, walks, foundations, bridges, culverts and dams.

Concrete used for foundations, which are to be subjected to oil and water seepage or drippage, and further to machine vibration, should be of rich mixtures. The effect of the quantity of cement used in concrete, disclosed in the following table, illustrates the advantage of utilizing rich mixtures for machine foundations, especially so where the bases are of small size.

QUANTITY OF WATER REQUIRED

Mix		Material in Mix			Gallons of Water Required per Sack of Cement	
Cement	Volume After Mixing	Cement	Sand	Gravel	Min.	Max.
1	3	1	1¼	2½	5	5½
1	4	1	1½	3	5½	6
1	4½	1	2	3	5¾	6¼
1	5	1	2	4	6	6½
1	6½	1	2½	5	7¼	7¾
1	7¾	1	3	6	8¼	8¾

A sack of cement weighs 94 pounds; four sacks being counted as a barrel of 376 pounds.

A ton of sand or gravel will vary from 19 to 22 cubic feet.

A cubic yard of sand or gravel will weigh 2,400 to 2,900 pounds.

Water in Concrete

In mixing concrete avoid using an excess of water as it weakens the product. Careless mixtures produce individual characteristics, some hard and brittle, others soft and friable. The addition of one pint of more water than is necessary in a one bag batch will decrease the strength and resistance to wear as much as if three pounds of cement were left out of the mix.

The water reacts chemically with the cement and the whole process being of chemical nature requires that the proportions be exact at all times.

In mixing concrete, whether by hand or machine, see that a thorough job is accomplished, so that after pouring, the mass will not consist of segregated material. It pays to mix thoroughly.

Lay the foundations as soon as possible and allow them as much time to dry and cure properly before erecting machine units on them. If a concrete foundation be kept damp for ten days it will be found that its normal compressive strength is increased 75 per cent.

The sand and gravel should be clean, free from coatings or admixed organic impurities, and structurally sound, that is, not friable or crumbling. Coarse sand will produce stronger concrete than fine sand, while gravel of larger size will produce stronger concrete than the smaller sizes. The sand must be clean and sharp.

COMPRESSIVE STRENGTH

Concrete Mix					Cement Sacks per Cu. Yd.	Compressive Strength Pounds per Sq. Inch
Cement		Sand		Gravel		
1	:	⅛	:	X	23.0	5720
1	:	⅜	:	¾	15.7	5070
1	:	¾	:	1½	10.5	4070
1	:	½	:	2	7.9	3570
1	:	1½	:	3	6.3	2760
1	:	2	:	3½	5.2	2090
1	:	3	:	5	3.9	1400
1	:	3½	:	7	3.1	1030
1	:	6	:	12	1.8	440

UTILITY SURVEY OF ELECTRIC REFRIGERATION

Edison Companies Study Effect on Customers' Use of Power

A REPORT of the Committee on Electric Refrigeration and Oil Burners of the Association of Edison Illuminating Companies has just been released by the press committee. The report was presented at the 41st annual meeting of the Association of Edison Illuminating Companies held at the Chateau Frontenac at Quebec, September 9th and 12th, 1929. Since the report is based on tests made independent of influence by manufacturing companies, and upon data furnished by public utilities handling various makes of equipment, it will be generally accepted as reliable and authoritative. The laboratory work and compilation of data for the Edison Association was done by the Electrical Testing Laboratories, of New York City.

In the report, the present status of the electric refrigerating machine is outlined in order to show the desirability of this type of load. Its characteristics and the causes for its rapid introduction as a current using device are presented. Changes and improvements are discussed in both the compressor and the motor, which show that present improvements will open up a larger field for future development and promotion.

The report recommends that local conditions should govern local policies of sales, but it is the committee's belief that an "Adjustment Service," which requires that the utility company render emergency service and do minimum repairs to all makes of good machines, will keep the greatest number of electric refrigerators operating safely on the utility's line.

Time payments are recommended over a period of from 12 to 24 months, and a suggestion is made that a rental plan is worthy of consideration. Answers to questionnaires returned from 33 public utility companies show that there is comparatively little hazard and few accidents occasioned by the use of residential refrigeration machines. A description of the various gases used as refrigerants is given, and a table prepared by Government agencies gives the chemical characteristics of the refrigerating gases. It is recommended that a sincere effort be made by all concerned to eliminate, as far as possible, the cause of present public fear, and to encourage frankly the adoption of better regulations covering the use of gases in the present installations of refrigerating equipment.

The latter part of the report is devoted to oil burners and brings out that the results of tests of oil burners shows that less consumption of electricity is obtained from these installations than previous estimates had indicated; also, that from temperature calculations exact figures can be reached as to the consumption and revenue of installations of oil burners.

The report is signed by the following members of the committee: R. H. Gillman (Chairman), Baltimore; Charles A. Collier, Atlanta; G. W. Lloyd, Chicago; A. D. McLay, Detroit; C. J. Nichols, New York; R. R. Young, Newark; W. C. McWhinney, Los Angeles, and A. C. McMicken, Portland.

The report is published in full by ELECTRIC REFRIGERATION NEWS except for two pages which have been deleted by the Press Committee.

COMMITTEE REPORT

Present Status: The effect of the development and application of the small mechanical refrigerators on central station income is generally appreciated by those who have given due consideration to the subject. Numerous investigations and reports showing the advantages of this class of business to the central station industry have been made, not only to demonstrate its summer load characteristics, but also to point out its revenue producing features. Time after time it has been shown that up to date no other domestic use of electricity is superior to the mechanical electrical refrigerator, from the standpoints of both the customer and the company. In previous reports of this Committee the desirable character of this business has been stressed, the development of the better types of machines has been described, and the various makes of machines which have given the best service under actual operating conditions have been recommended for adoption by Member Companies for commercial promotion. Most of the Member Companies have taken active part in carrying out these recommendations, and in consequence enjoy a large improvement in their residential income. This interest and activity shown by our companies in this particular branch of business has contributed materially to the growth of mechanical refrigeration, which growth has exceeded all expectations. If both the manufacturers and the central stations continue to work on the problem, it is safe to predict that the next year will set an unexpected record in the sale and use of small machines. With increased production, lower prices may be expected, and improvements in quality should result in the deevlopment of larger and better manufacturing methods.

Improvements: During the past twelve months all the leading manufacing companies have improved their machines. With most manufacturers, the marketing of quieter machines has, perhaps, been the greatest single step leading to wide public acceptance. These quieter machines have been developed by holding moving parts to closer clearances, better balancing of rotating parts, better mounting of equipment to eliminate vibration, but more particularly by the use of especially designed refrigeration motors. The motors as now used are made practically noiseless through the use of rubber mounting of frames and rubber dampening, doing away with noises formerly caused by the centrifugal device on the repulsion induction motors.

Prices have also been reduced because of the larger volume production by a small number of large manufacturers. Cabinets have been improved through experience gained in their manufacture, and there is promise of further price reduction by the use of other insulating materials than cork. If the changes can be made without affecting efficiency or durability, much progress will have been made.

There seems to be an increasing field for applications of small refrigerating machines outside the scope of food preservation. The water cooler field is expanding through the production of better and lower priced coolers and through an increasing demand on the part of the general public for cool drinking water. The Committee also realizes that in addition to the growing dairy uses and other commercial applications, there is a definite trend toward the use of refrigeration in conditioning air and in cooling large spaces. When we consider the possible future development in residence and apartment cooling and its effect on the utility business, the Committee on Refrigeration of this Association should give a good deal of attention in the future to this phase of load promotion.

The Committee investigated several new types and designs of machines, and examined the results of many recent tests, but believes the findings to be of insufficient importance to mention them at this time.

Sales Policies: The policies used in selling must be governed mainly by local conditions, but it would be well to give thought to the best general policy for the future. At present there are a variety of Member Company policies in effect. Some companies handle one machine, some handle several, others advocate all but sell none. There is equal diversification in the handling of the service problem. Since the utility company is primarily interested in the promotion of refrigeration sales, it would appear reasonable that it sell and service at least one machine in order that its customers may have visible evidence of the Company's stamp of approval on the refrigerating machine. Although it should set this example and prove the advantage of electrical refrigeration by its sales efforts and service policies, we do not advise making the competition felt to the point where individual dealers cannot successfully compete because many active dealers in the field may result in more machines being placed on the lines. By the same token, if the utility company undertakes to service all machines, it will be expensive; and to accept such responsibility would cause embarrassing situations with customers who had bought "orphans." Moreover, the manufacturing companies of some machines have serious objections to this policy. However, an "adjustment service," which makes the utility company render emergency service and do minor repairs, requiring a limited time on the job will be found advisable to keep the greatest number of machines safely operating on the lines. Companies can also well afford to adopt the policy of advertising the benefits of refrigeration to the general public, as well as to further other promotional work.

Payments: An extended investigation covering the field of time payments shows that the period of payment varies from 12 to 24 months, with an initial payment of 10 per cent. The average shows 18 months with 10 per cent down, and carrying charges on balance at 6 per cent. Local conditions among dealers and manufacturers vary widely, and in many instances longer time is allowed and higher rates are charged. As the refrigeration machine constitutes one of the large investments in the home equipment, and as it is the best known revenue producer per kilowatt of station capacity, the utility company will find it good business to offer long term payments.

Rental: Another possible method to get machines on the lines has been proposed to the Committee, and while we are not entirely in sympathy with it, at the same time it may have its advantages in the future. This proposal is, briefly, that the manufacturers rent refrigerators or go into the business of providing means of refrigeration as the telephone company provides the medium of communication. It is proposed that the utility company install and maintain the refrigerator, collect on its monthly bills enough to make fair profit and thus put more machines on the line because the painful first cost and the uncertain cost of service is eliminated. It is claimed that the refrigerator is not subject to the abuse of the user and consequently lends itself to the rental idea, and that health protection to the community is made available by the provision of refrigeration to those homeowners who think they cannot afford it now. Naturally some objections would follow, namely:

1. The ice man is one of our largest customers.
2. Rental might not be so easy to collect monthly, especially in winter.
3. The rental charge might be so high that user could buy a machine for about the same as the monthly rental.
4. The unit is not entirely free from abuse, and a machine turned in would require complete refinishing and many people would object to the use of a "used" or rented cupboard for the family food.

It is believed that most of these objections are not serious, and that in the very near future we may reach a class of refrigerator prospects whose income makes it difficult to finance the purchase of a refrigerator and who would prefer to rent one. This scheme is worthy of consideration.

Present Electric Refrigeration Situation

The Chicago Situation: During the past twelve months a series of accidents has occurred in the city of Chicago in connection with leaks developing in refrigerating systems, chiefly in apartment houses. A number of these were rather definitely diagnosed as cases of methyl chloride poisoning, some of which resulted fatally. The Health Department of that city began an investigation several months ago when these accidents had apparently become rather numerous, and a great deal of publicity was given to this subject by the press throughout the country. A number of articles appeared dilating on the danger to human life that might be encountered through the use of domestic machines. In some instances this has caused a perceptible reaction against these machines or at least a feeling of insecurity which we believe is unwarranted and should be overcome.

It appears that these accidents were not entirely confined to those systems using methyl chloride, but included some sulphur dioxide systems as well, although there have been no fatalities reported from the use of this latter refrigerant. In all the cases which merit consideration that have come to our notice, it is the opinion that the multiple system only is involved. This multiple system consists of a single compressor, usually located in the basement, with piping carrying the refrigerant to evaporating coils located in the individual refrigerators in different apartments. This system necessitates the use of large quantities of refrigerant, often two or three hundred pounds, and under certain conditions it may be possible for the major part of this refrigerant to escape through a leak in the piping connections to one refrigerator box. It is clearly evident that this was the case in each one of the accidents that has been reported, for it is apparent that the accidents have been due to the multiple system as installed in these buildings and not to the refrigerant itself. With the exception of air, there is no known refrigerant that is non-poisonous and any of those now in use may be dangerous when found in sufficiently high concentrations. As the amount of gas employed in the individual refrigerator unit is usually in the neighborhood of two pounds, it would be very difficult to get a concentration high enough to cause anything more than a slight discomfort even if the whole amount were discharged into the atmosphere at one time. However, where several hundred pounds of refrigerant are involved as in multiple systems, sufficient concentration may be established to produce disastrous results.

The question of the toxicity of various

(*Continued on Page 32, Column 1*)

EDISON COMPANIES REVIEW PROGRESS OF REFRIGERATION

(Continued from Page 31. Column 5)

some of their findings have previously been reported by this Committee. Fur-

refrigerants has already been carefully studied by governmental authorities and ther studies prompted by these recent accidents are now being carried on, and it is probable that in the near future we will be much better informed on this subject than we have been heretofore.

During the early agitation in Chicago, the first action by the city authorities was to order the discontinuance and draining in the city, of every system in the city using methyl chloride. This drastic suggestion was not carried out, however, and definite action was held in abeyance pending the result of the hearings that were called by the governmental bodies. These hearings soon disclosed the fact that if proper precautions were taken, any refrigerant might be made safe, and the opinion was gradually developed that the system involved could be so constructed and installed as to render the possibility of a leak or an accident negligible. The city of Chicago has no code applicable to installations of this kind, and so it was determined that if a proper code could be drawn up, the provisions of which would assure adequate protection, that the source of the accidents would be removed. This has resulted, at the time at which this report is written, in the formation of three separate codes, one drawn up by the Commissioner of Health, one by the Manufacturers and the third by the Boiler Inspection Department of the city. At the present time these three codes are not in agreement, but all will permit the installation of multiple systems if varying degrees of precaution are used. For example, the code submitted by the Health Commissioner requires that the apparatus be so constructed that not more than two pounds of refrigerant may be discharged from a single evaporator, or in other words into one living apartment, and not more than ten pounds into any uninhabited part of the building, which would probably be in the basement where the compressor is installed. There are so many mechanical difficulties surrounding this code that it will most likely be found unworkable; probably the result will be a compromise between this code and the others.

The manufacturers' code limits the use of refrigerant to 100 lbs., increasing this to 300 lbs. if the system is under the constant supervision of a trained man. All have agreed, however, that the multiple systems may be considered safe if the best methods of installation and the best materials available are used.

One of the best presentations of this subject appears in the Journal of The American Medical Association of August 3, 1929, in which Doctors Kegel, McNally and Pope give a very thorough dissertation on methyl chloride as a poison with the case history of the Chicago accidents, and in their summary they state that—

"All cases of methyl chloride poisoning reported in Chicago have occurred in kitchenette apartments having multiple unit refrigerating systems and where a leak was discovered in the apartment unit."

Your Committee believes that the multiple system has a definite place in the refrigeration field and that under the proper conditions it should be encouraged, but always with the safeguard of a satisfactory code which would insure safety.

In order to overcome the possible uneasiness that may be found among users and prospective users of mechanical refrigeration, every effort should be made to see that this type of refrigerator is entirely safe and with this in mind, possibly a wider knowledge of the statement of the Public Health Service may be of benefit in attempting to establish this confidence. There is therefore included a copy of this statement as it was released by the government subsequent to the accidents. This is as follows:

United States Public Health Service

Problems of Mechanical Refrigeration

Several deaths which have occurred recently in Chicago have been attributed to poisoning by methyl chloride which leaked from refrigerating systems. These have received wide publicity, and have caused apprehension, even among the users of refrigerating equipment entirely unlike that to which the fatalities have been attributed. It is the purpose of this statement, authorized jointly by the Public Health Service, the Bureau of Standards, and the Bureau of Mines, to state the essential facts regarding this danger and to relieve any undue anxiety in the minds of those possessing household refrigerating systems.

All refrigerating systems in practical use depend for their operation upon the repeated gasification and condensation (sometimes by disolving or "absorbing" in another substance) of a material which is technically called a "refrigerant." In most cases the refrigerant is confined under pressure in the refrigerating machine and, if it escapes from the system, becomes a gas which mixes with the surrounding air.

For many years the gas ammonia was almost the only refrigerant used. For technical reasons, other refrigerants have more recently been introduced and are now extensively employed. Sulphur dioxide and methyl chloride are the most important of these.

None of the three refrigerants mentioned, ammonia, sulphur dioxide or methyl chloride, can be breathed with impunity, but none are violent poisons when breathed for a short time in low concentrations. If the same amount of the three substances is considered, methyl chloride is the least poisonous of the three; but because their physiological effects are quite different it is hard to make a quantitative comparison. Sulphur dioxide and ammonia both have strong odors which are easily recognized and are so irritating that no one is likely to breathe much of them if escape is possible. Methyl chloride has a slight and rather pleasant odor, which probably would not awaken a sleeping person and might not be recognized by one who was awake. To this fact is to be attributed any greater hazard from methyl chloride than from other commonly used refrigerants.

Most of the trouble attributed to methyl chloride has occurred in connection with multiple refrigerating systems installed in apartment houses in which a single compressor delivers the refrigerant through tubes to the refrigerators in the several apartments. A large majority of the individual household refrigerators of the motor-driven ("electric") type now in use employ sulphur dioxide as the refrigerant. Nearly all, if not all, of the domestic refrigerators, the operation of which depends upon supplying heat instead of mechanical compression, use ammonia. This class includes a few electric refrigerators of unusual type and all of the gas-fired refrigerators. The escape of the refrigerant from the more commonly used household refrigerating system would, therefore, be at once made evident by its odors.

Newspaper headlines and statements to the effect that the fatalities in Chicago were caused by "gas refrigeration" without doubt had reference only to the fact that refrigerants are gases. "Illuminating" or fuel gas was in no way involved.

The high volatility of all practicable refrigerants makes it quite improbable that enough of these substances could be retained in food stored in the refrigerator to be harmful.

Methods for eliminating the danger from methyl chloride systems are being studied. It would be premature to say whether the end will be accomplished by replacing methyl chloride entirely by other refrigerants, by adding something which will give the refrigerant a sufficiently powerful odor, or by so improving the mechanical construction of the equipment that leakage will not occur where the gas might enter rooms in which people live.

It should be recognized that the number of serious accidents from household refrigerating systems has been small in comparison with the number of such systems in use, and improvements may be expected which will much reduce the small hazard that does exist.

Replies to Questionnaire: Due to the recent wide publicity which has been given to the series of accidents in Chicago, it was felt advisable to determine the consensus of opinion from member companies concerning the effects on business, and to obtain some information about any accidents that had occurred elsewhere. Accordingly a questionnaire was sent to a number of Member Companies in widely separated sections of the country. Thirty-three replies have been received to date, and your Committee is glad to report that the consensus of opinion points to very few accidents, and that the public as a whole is not unduly alarmed. Most of the accidents reported apparently resulted from fire caused by inflammable refrigerants. No cases of poisoning or serious effects were reported from the escape of non-inflammable irritant gases.

Service: Replies to the questionnaire on service indicate that the majority of calls are for adjustments. Also that for charge customer service the prevailing practice is to charge for work done on a time and material basis. Labor charges vary from about one dollar per hour to one dollar and a half per hour with material charged for at list prices. There is quite a variation in the number of calls and in the cost of yearly machine service cost per machine reported by the different Member Companies. It is significant to note that the number of service calls and the cost of service per machine decreases after the free service period expires. Table I gives the experience of some of the companies.

TABLE 1—SERVICE DATA

Company	What is the length of free service period	What is the average number of calls per machine during free service period A	B	C	What is the average number of calls per machine per yr. after free service period A	B	C	What is the average cost per machine for service during free service period A	B	C	What is the average service cost per machine per year after free service period A	B	C
A-1	3 mo. 1 yr. and 2 yrs.	1	none	4	1	none	3	$ 1.40	none	Fig. with each inst.	—	none	$ 5.00
A-2	12 months	0.8	6	2.2	7	2	3	0.43	$16.25	$ 0.92	$ 0.83	—	1.42
A-3	1 machine 2 yrs. all others 1 yr.	2	2	2	2	2	2	4.00	4.00	4.00	5.00	5.00	5.00
B-1	1 year	3.5	3.5	7	1.2	1.2	3	12.00	12.00	24.00	3.50	3.50	7.00
B-2	1 machine 2 years another 20 months	4.5	6	4	1.5	7	2	11.00	11.00	18.00	8.00	26.55	12.00
B-3	90 days	0.04	0.2	0.025	1.25	—	1.25	—	—	—	3.10		4.50
C-2	1 year	1.8	3	3	1.6	2	2	5.00	7.00	7.00	4.00	5.00	6.00
H-1	1 year	2	2	4	1	2	2	3.00	4.00	6.00	2.50	4.00	5.00
H-2	1 year one machine 2 years one machine	8	12	15	4	4	4	15.00	35.00	50.00	7.00	10.00	35.00
I-1	3 months	1	3	1.5	1	3	1	1.50	5.00	1.75	3.50	10.00	5.00
L-1	1 year	6	15	3	4	10	2	18.00	50.00	10.00	12.00	30.00	5.00
M-1	1 year	2.3	1.3	—	1.4	0.7	—	11.12	6.22	—	1.54	0.73	—
N-1	3 months domestic 1 year multiple	1	3	3	1	2	2	4.00	25.00	10.00	3.00	25.00	6.50
N-3	1 year	2	2.5	6	0.7	1	2	2.00	2.00	6.00	3.00	3.00	5.00
N-4	1 year	5	—	5	3	—	3	10.00	—	10.00	7.00	—	7.00
N-6	1 year	4	—	5	2.5	—	3	12.00	—	15.00	8.00	—	10.00
P-1	2 years 1 machine others 1 year	4	—	3	3	—	1	12.50	—	15.00	2.00	—	10.00
R-2	1 year	3	6	4	1	7	5	3.00	6.00	4.00	1.00	1.00	1.00
S-1	1 year	2.5	2.5	2.5	1.5	1	2	10.00	1.00	20.00	2.75	1.00	10.00
S-2	90 days	0.8	0.8	0.8	0.9	0.9	0.9	6.00	6.00	6.00	2.90	2.90	2.90

The Relative Hazard and Toxicity of Refrigerating Gases

The unfortunate occurrences in Chicago and a few other places have created considerable fear in the public mind of the use of chemical refrigerants. However, the fact is clearly proven by the results of governmental and other experiments that these materials can be properly used in the domestic refrigerators without hazard to public health or safety.

There are several gases used by refrigerator manufacturers for refrigerants, the most widely used being sulphur dioxide, ammonia, methyl chloride, ethyl chloride and isobutane. Of these, sulphur dioxide is probably the most widely used. All but one, isobutane, are poisonous compounds, and the following table (Table III), taken from the Government's Public Health Bulletin No. 185, shows the relative toxicity of these and other common gases. A full discussion of this question was presented in last year's report.

From this table it may be seen that both sulphur dioxide and ammonia are more poisonous than methyl chloride. It requires from 2 to 4 parts by volume of methyl chloride in air to be dangerous in a period of 30 to 60 minutes; from one-quarter to one-half per cent of ammonia and from 4 to 5 one-hundredths per cent of sulphur dioxide would be equally dangerous. Therefore, some might conclude that it is much more dangerous to use sulphur dioxide or ammonia than methyl chloride. Actually though, other characteristics of these gases, having inherently as they do, odorous and irritating properties when they escape, give warning to persons. Even if a person were asleep he would be awakened by the warning action of these gases before any toxic or poisonous action started. Thus these two gases, the most widely used as refrigerants, have the self-warning characteristics, a consideration of great importance to those interested in refrigeration.

In sharp contrast with these facts, the Government investigation further shows that apparently methyl chloride and methyl bromide, and possibly ethyl bromide and ethyl chloride, do not possess sufficient warning properties to prevent serious results by voluntary exposure. It would seem then, that although these gases are less toxic than either sulphur dioxide or ammonia, the hazard of their use is far greater. Therefore, both the toxicity and hazard of gases used as refrigerants must be considered before making any criticisms or recommendations as to the better gases to use.

It has been recommended by the Government that where non-odorous or non-irritating gases are used for refrigerants, some chemical warning agents be added to these gases. Unfortunately, the investigation along this line has not progressed far enough to make definite recommendations as to what agents may be satisfactorily so used. A careful trial under conditions similar to refrigerating conditions must be made before the behavior of such warning agents can be determined. They must be present in sufficient quantities in both the liquid and gaseous states and in all parts of the system to give sufficient warning.

There are three classes of warning agents that might be used; one merely odorous, one of an irritating type, or third, a combination of both in one agent. It is the consensus of opinion that the merely odorous agent may not have sufficient warning capacity to awaken a sleeping person. To do this one needs a lachrymatory or sternutator such as tear gases or sneezing gases. They are irritating to the nose and lungs and would cause a sleeping person to awaken by sneezing or weeping before the concentration of the refrigerant vapor is sufficient to do any harm.

Sulphur dioxide, the most widely used of the present refrigerant gases, is an excellent illustration of this type of gas, showing the relation between the toxicity and hazard. As little as one part of

(Concluded on Page 33, Column 1)

TABLE III—PHYSIOLOGICAL RESPONSE TO VARIOUS CONCENTRATIONS OF SOME COMMON GASES AND VAPORS

	Kills most animals in a very short time % by volume	Relative order	Dangerous in 3 to 60 min. % by volume	Relative order	Max. amount for 60 minutes without serious disturbances % by volume	Relative order	Slight symptoms after several hrs. or max. amount for prolonged exposure % by volume	Relative order
Phosgene	0.02–0.05	1	0.0025	1	—	—	0.0001	1
Chlorine	0.10	2	0.004–0.006	2	0.0004	2	0.0001	1
Bromine	0.10	3	0.004–0.006	3	0.0004	3	0.0001	1
Hydrogen Sulphide	0.06–0.10	4	0.05—0.07	6	0.02—0.03	7	0.01—0.015	7
Hydrocyanic Acid	0.048	5	0.012–0.015	4	0.005–0.006	4	0.002–0.004	3
Hydrogen Chloride	0.1—0.2	6	0.15—0.20	7	0.005–0.01	5	0.001–0.005	4
Sulphur Dioxide	0.2	7	0.04—0.05	5	0.005–0.02	6	0.01	2
Carbon Dioxide	0.5—1.0	9	0.25—0.45	10	0.03	8	0.01	6
Ammonia	.05—1.0	9	0.25—0.45	10	0.03	8	0.01	6
Benzene	1.9	10	—	—	0.31—0.47	11	0.15—0.31	13
Gasoline	2.4	11	1.1 —2.2	11	0.43—0.71	14	—	—
Methyl Bromide	2.0—4.0	12	0.2 —0.4	9	0.1	10	0.005–0.017	5
Chloroform	6.8—8.2	13	1.4	12	0.5 —0.6	13	0.2	8
Carbontetra Chloride	4.8—6.3	14	2.4 —3.2	14	0.4 —0.6	12	0.16	11
Ethyl Bromide	10 — 20	15	1 — 2	13	0.6	15	0.17—0.3	12
Methyl Chloride	15 — 30	16	2 — 4	15	0.7	16	0.05—0.10	10
Ethyl Chloride	15 — 30	17	6 — 10	16	4	17	2	14

EDISON LABORATORY REPORTS ON MOTORS

(Concluded from Page 32, Column 5)

this gas in one hundred thousand parts of air will cause violent coughing. A concentration of one part per ten thousand cannot be tolerated by the human person. From Table III it will be seen that 0.01 per cent concentration of this gas will show only slight symptoms after several hours exposure, or is the maximum amount which can be tolerated for a prolonged period without serious physiological effects. Therefore, it is quite evident that sulphur dioxide, while more toxic than methyl chloride, for example, is by far less hazardous, and less likely to give permanently serious consequences. Ammonia, though less violent, is almost equally vigorous in the warning it gives.

It is important that the distinction between single and multi-unit installations be emphasized. In apartment houses it is found that the multi-unit systems are used where from 10 to 15 evaporators or boxes are installed on one compressing unit. The amount of refrigerant available to escape through a leak at any one point is much greater than in the single unit system. It is estimated that about two pounds of refrigerant are used for each evaporator, and that the pressures on the high side of the system may be greater than in the single unit installation. Therefore, the relative toxicity, hazard and also the flammability of the refrigerant used should be given more consideration, as the concentrations possible are likely to be higher.

The question of flammability is potentially a greater hazard with some refrigerants than are the toxic effects. For example, isobutane, which is a highly volatile gasoline, and methyl chloride, when mixed with air, form highly explosive gases. A mixture of methyl chloride and methyl bromide tends to decrease the flammability of the mixture, but increases the toxicity, since the bromide is nearly ten times as poisonous as the chloride.

Summing up, we believe that a sincere effort should be made by the manufacturers, the sales agencies, and any other group interested in either refrigeration or public health and safety, to correct the causes of the fears, recently amplified in the public mind, regarding the hazard of using toxic or flammable gases as refrigerants. In order to do this, a frank and open discussion of qualifications of the commonly used gases should be encouraged and a workable and uniform national code, covering the installation and inspection of mechanical refrigerators should be adopted.

Refrigeration Codes: There are at present a number of refrigeration codes suggested for adoption by the city of Chicago, but at this writing no decision has been reached to accept any one or a combination of provisions from all. Some of the member companies are following the code prepared by the National Board of Fire Underwriters, or variations of this code for multiple installations. While it is recognized that there should be a code covering refrigeration installations, care should be taken to see that costly provisions are not adopted which would tend to reduce sales. Your Committee feels that a code should embody the following points among other considerations:

(1) The use of a refrigerant which is not inflammable and which, if it has poisonous properties, would give warning of its escape by being decidedly irritating — sufficiently so to awaken sleeping persons and cause others to get away.

(2) Should take into consideration the use to which property is being put. To illustrate, poisonous refrigerants should not be used in hospital wards, where patients are physically unable to escape.

(3) Safe installation methods should be employed to minimize hazards of fire and mechanical injury which would cause gas to escape.

(4) Proper instructions should be furnished and prominently displayed at each condensing unit, telling what to do in emergencies such as fires or leaks.

(5) Only thoroughly capable persons or firms should make installations, particularly of the multiple type. Such persons or firms should be licensed, or a small fee charged for inspections if under municipal control.

MOTORS

Repulsion-Induction Type Motors: As a result of the determined efforts of the central station industry in its demands for improvements in fractional horsepower motor designs, considerable progress has been made by motor manufacturers toward effecting the desired improvements, particularly through the development and present manufacture of greatly improved repulsion-induction type motors.

The improvements attained in these motors embody higher power factor, high apparent efficiency, higher starting torque per ampere of starting current, and considerably quieter operation. While the values of power factor and apparent efficiency attained in some ¼-hp. designs are each as much as 5 points higher than the Joint Committee's minimum long-hour specifications, the greatest improvement in the repulsion-induction motor designs has been in their efficiency which the E. T. L. tests have shown to be as high as 74 per cent, or 12 points higher than the minimum long-hour specification of 62 per cent for ¼-hp. motors. Considerably quieter operation of motors for refrigerator service has been accomplished, mainly through the use of enclosed motor frames separated from their bases or cradle mountings by rubber, and through the use of rubber pads or silencers on the centrifugal switch and brush mechanisms.

The investigations which have been conducted so far indicate that the apparent maximum of efficiency has been attained in the best 1/6-hp. and ¼-hp. size repulsion-induction motor designs, and that further development of electrical design will probably be mainly directed toward effecting an increase in power factor.

Condenser Type Motors: It is therefore logical that further improvement in the electrical operating characteristics of fractional horsepower a.-c. motors is dependent in considerable measure on the satisfactory development and adoption of the condenser or capacitor type motor, with which it is possible to obtain a much higher power factor and still maintain the same degree of efficiency as the best repulsion-induction motor.

While capacitor motors are now available in 1/6-hp. and ¼-hp. sizes, which show performance characteristics conspicuously better than those required by the Joint Committee specifications, and which surpass repulsion-induction type motors in power factor and apparent efficiency, and have efficiencies equivalent to those of the best repulsion-induction motors, it is not easy to build them with starting torque comparable to that of repulsion-induction motors, and some of the developmental designs of capacitor motors were deficient in this particular.

Of the several makes of condenser type motors tested by E. T. L. last year, one make alone was found conspicuously suitable for general application, particularly for refrigerator drive, although it is understood that other makes with satisfactory starting characteristics are now available. The operating characteristics of this particular make of capacitor motor, their comparison with the Joint Committee Specifications, and with the characteristics of the best repulsion-induction type motor of the same rating (¼ hp. and 1/6 hp.) are given in Table V.

In view of the central station industry's extreme interest in the development and manufacture of fractional horsepower single phase motors of higher power factor and higher apparent efficiency at prices which will be more competitive with those of repulsion-induction type motors, several of the larger motor manufacturers have become actively engaged in the investigation and development of capacitor type motors.

It is hoped that this co-operative interest on the part of the larger manufacturers will result in the development and manufacture of satisfactory capacitor motors of simpler and more practical design at prices which will make them competitive with the best quality repulsion-induction type motors, and thereby accelerate their adoption for use in the near future with electric refrigerator and oil-burner equipments.

Usage of Improved Motors: Since the satisfactory development and manufacture of the five installations for the normal heating season for Baltimore is 803 kw.-hr. or an average of approximately 160 kw.-hr. per burner per season. This ture of single phase repulsion-induction type motors with greatly improved electrical characteristics, and possessing a far greater degree of quietness in operation at only slight increase in price, there has been a general acceptance and adoption of such motors by refrigerator manufacturers, a good many of whom are now regularly furnishing the improved repulsion-induction motors with their equipment. There has, however, been no noticeable evidence of the adoption and use of the improved repulsion-induction motors by oil burner manufacturers. This is probably due to the fact that the electric operating cost of oil burner equipment is such a small portion of the total operating cost that oil burner manufacturers are slow in adopting the use of the more efficient type motors. It will therefore require a greater effort on the part of central station interests to establish the use of the improved motors by oil burner manufacturers.

Summary of E. T. L. Tests: A brief summary of the starting and full-load operating characteristics of various repulsion-induction type and capacitor type motors tested by Electrical Testing Laboratories last year is given in Tables VI and VII, classified according to their horsepower ratings.

Note—The comparison of starting and full load operating characteristics of motors, shown in Tables VI and VII, was drawn from tests made by Electrical Testing Laboratories more than a year ago.

Voltage Variation on Lighting Circuits Caused by Motor Operation: With the operation of motors on residential services for driving refrigerating machines, objectionable lamp flicker may be noted in many such installations where single cylinder compressors are used. In addition to the lamp flicker due to the momentary drop in voltage caused by the starting current of the motor, the variation in load during each revolution of single cylinder compressors causes appreciable pulsation in current taken by the driving motor, resulting in many instances in a cycle voltage fluctuation caused by the varying line drop and producing a cyclic lamp flicker. This cyclic lamp flicker caused by load pulsations during the operation of motor driven single cylinder compressors is particularly noticeable where the installation is supplied over a long secondary distribution bus, where the line resistance and the voltage drop are greater. By employing greater flywheel effect and counterbalancing the crankshaft of single cylinder compressors, it is felt that the effects of load pulsation and vibration may be reduced.

CHAS. A. COLLIER, Atlanta.
E. W. LLOYD, Chicago.
A. D. MCLAY, Detroit,
C. K. NICHOLS, New York.
R. H. TILLMAN, Chairman, Baltimore.
R. R. YOUNG, Newark.
Correspondent Members:
W. C. MCWHINNEY, Los Angeles.
A. C. MCMICKENN, Portland.

TABLE V—COMPARISON OF CONDENSER MOTOR WITH REPULSION-INDUCTION MOTORS

Characteristics	Condenser motor values	No. of points higher than: Joint committee Specifications	No. of points higher than: Best repul.-ind. motors of same rating
	¼ hp.		
Per cent F.L. Power Factor	84.6	24.6	13.8
Per cent F.L. Apparent Eff.	62.4	20.4	15.0
Per cent F.L. Efficiency	73.8	11.8	Equal
Starting Current (L.R. Amp.)	18.8	Within spec.	45 per cent higher
Starting Torque (Per cent of F.L.)	495	—	Practically same
Pull-out Torque (Per cent of F.L.)	277	—	Practically same
	1/6 hp.		
Per cent F.L. Power Factor	72.1	16.1	6.5
Per cent F.L. Efficiency	67.5	8.5	Equal
Per cent F.L. Apparent Eff.	48.7	12.7	3.0
Starting Current (L.R. Amp.)	13.8	Within spec.	50 per cent higher
Starting Torque (Per cent of F.L.)	467	—	25 per cent lower
Pull-out Torque (Per cent of F.L.)	314	—	Practically same

TABLE VI—COMPARISON OF STARTING AND FULL LOAD OPERATING CHARACTERISTICS OF MOTORS TESTED BY ELECTRICAL TESTING LABORATORIES

Motor Code No.	P. F.	Eff.	Appar. Eff.	P. F.	Eff.	Appar. Eff.	Locked Starting Rotor Torque: Amp. Spec.	Locked Starting Rotor Torque: % F. L.	Remarks
1/6 Hp. (Rep.-Ind.) Min. Spec.	56	58	36	52	46	27	20	—	
J—1	64.3	71.3	45.7	64.3	71.3	45.7	9.0	670	
J—2	61.0	67.6	41.2	61.0	67.6	41.2	8.8	723	
H—1	63.7	64.7	41.2	63.7	64.7	41.2	7.3	486	
F—1	58.9	66.1	38.9	58.9	66.1	38.9	8.0	487.5	
C—1	58.0	63.0	36.5	58.0	63.0	36.5	8.3	507	
G—1	56.1	62.8	35.25	56.1	62.8	32.25	8.0	658	Refrig. type
M—1	57.2	61.5	35.2	57.2	61.5	35.2	9.2	388	
D—1	57.2	60.1	34.4	57.2	60.1	34.4	8.0	403	Refrig. type
D—2	65.7	56.0	36.8	65.7	56.0	36.8	6.5	408	
A—1	64.8	56.0	36.3	64.8	56.0	36.3	6.1	324	
O—1	55.7	61.0	34.0	55.7	61.0	34.0	8.0	536	Spec. refrig.
N—1	63.8	54.1	34.5	63.8	54.1	34.5	8.0	613	
B—1	61.8	48.7	30.1	61.8	48.7	30.1	7.0	471	
G—2	54.8	48.4	26.5	54.8	48.4	26.5	10.8	373	
G—3	55.2	47.0	25.9	55.2	47.0	25.9	9.6	440	
¼ Hp. (Rep.-Ind.) Min. Spec.	60	62	42	56	51	32	20	—	
A—2	70.8	67.0	47.4	70.8	67.0	47.4	10.2	501	
J—3	63.2	73.2	46.3	63.2	73.2	46.3	13.5	505	
G—4	64.3	73.4	47.2	64.3	73.4	47.2	13.0	740	Refrig. type
N—2	64.8	69.1	44.7	64.8	69.1	44.7	11.5	447	Refrig. type
M—2	60.4	74.0	44.8	60.4	74.0	44.8	13.0	477	
O—2	62.6	68.6	42.9	62.6	68.6	42.9	14.0	456	Spec. refrig.
L—1	64.2	68.3	43.8	64.2	68.3	43.8	11.8	512	
H—2	64.9	66.6	43.2	64.9	66.6	43.2	8.7	470	
F—2	63.0	67.8	42.7	63.0	67.8	42.7	10.2	439	
J—4	63.5	67.3	42.5	63.5	67.3	42.5	12.8	783	
C—2	63.7	66.2	42.2	63.7	66.2	42.2	11.8	501	
E—1	68.8	59.7	41.1	68.8	59.7	41.1	8.8	320	
K—1	57.5	65.0	37.4	57.5	65.0	37.4	12.9	470	
N—3	61.6	59.5	36.6	61.6	59.5	36.6	12.0	493	Gen. purpose type
G—5	57.7	57.4	33.1	57.7	57.4	33.1	13.0	437	
B—2	54.1	51.4	27.8	54.1	51.4	27.8	12.0	406	

TABLE VII—COMPARISON OF STARTING AND FULL LOAD OPERATING CHARACTERISTICS OF MOTORS TESTED BY ELECTRICAL TESTING LABORATORIES

Motor Code No.	Long hour specifications: P. F.	Long hour specifications: Eff.	Long hour specifications: Appar. Eff.	Locked rotor Amp. Spec.	Starting torque % F. L.	Remarks
¼ Hp. (Con. type) Min. Spec.	60	62	42	20	—	
G—6	84.6	73.8	62.4	18.8	495	
I—1	95.5	66.1	63.1	11.5	255	
I—2	89.4	66.8	59.7	10.7	126	
A—3	96.0	67.0	64.3	10.2	114	
1/6 Hp. (Con. type) Min. Spec.	56	58	36	20	—	
G—7	72.1	67.5	48.7	13.8	467	
D—3	73.6	69.9	51.4	17.1	*178	(Clutch type)
G—8	92.7	61.5	57.0	15.3	482	(Type used in G. E. refrig.)

*Note.—This motor starts as split phase clutch type motor and has condenser connected by centrifugal switch after motor has accelerated. In this respect it is not a true condenser type motor compared to the others.

PORTLAND CODE IS CONSIDERED FAIR TO MULTIPLE SYSTEMS

THE City Council of Portland, Oregon, on November 27, 1929, adopted a code governing the installation, maintenance and inspection of multiple refrigerating systems. This code, which is printed on this page, was passed as a safety measure and took effect immediately. The complete ordinance follows:

ORDINANCE No. 57621

An ordinance providing regulations for refrigeration machines and equipment to be known as the Refrigeration Code, and providing a penalty for the violation of the same and declaring an emergency.

The City of Portland does ordain as follows:

NAME.

Section 1. This ordinance shall be known as the Refrigeration Code.

DEFINITIONS.

Section 2. For the purpose of this code the following definitions of words and terms shall govern:

"Approved," when this term is applied to materials or appliances it means such materials and appliances as have either been approved by the Underwriters' Laboratories, or to such materials or appliances as have been approved by the Inspector of Buildings as complying with the provisions of this code, or which are equivalent to the materials and appliances approved by the Underwriters' Laboratories.

"Multiple Refrigeration System" shall mean a system in which the refrigerant from a common source is delivered to two or more evaporators.

"Non-Residential Building" is a building in which there are no living or sleeping accommodations.

"Refrigerant" shall mean the chemical agent used to produce refrigeration. This term shall not be understood to include brine.

"Refrigeration System" shall mean apparatus or a system of piping and machinery in which a refrigerant is circulated for the purpose of extracting heat.

SCOPE OF THIS CODE.

Section 3. The regulations of this code shall not apply to refrigeration installations using as refrigerants ammonia or carbon dioxide. The regulations of this code shall apply only to multiple refrigeration installations hereafter installed and to the alterations of or the additions to existing multiple refrigeration installations.

PERMITS REQUIRED.

Section 4. No multiple refrigeration system shall hereafter be installed, nor shall a multiple refrigeration system be enlarged or extended unless a permit for the same has first been obtained from the Bureau of Buildings.

FEES FOR PERMITS.

Section 5. The fee to be paid for refrigeration permit shall be as follows:

For each pressure imposing element	$3.00
For the first evaporataor of a system	.50
For each additional evaporator	.25
The minimum fee shall be	1.00

REFRIGERATION SYSTEMS TO BE INSPECTED.

Section 6. Before any multiple refrigeration system is placed in operation it shall be tested as follows, in the presence of the Inspector:

A vacuum test shall be made of the complete piping system, preferably with the evaporator installed, but the valves thereon may be closed to prevent the withdrawal of the refrigerant. Under this test a vacuum of 20 inches of mercury shall be placed upon the system and shall be held for a period of 30 minutes with no detectable drop after the pump has been stopped. After the vacuum test the system of piping shall be tested by the application of a pressure of 180 pounds per square inch on the high pressure side, and not less than 80 pounds per square inch on the low pressure side. The piping shall withstand these pressures without distress or sign of leaks. It is suggested that the test pressures be imposed by the use of carbon dioxide or nitrogen. If the piping withstands the tests properly and the installation is in accordance with the code, a certificate of approval shall be posted on the premises where the system is installed.

NO INSTALLATION SHALL BE OPERATED UNTIL APPROVED.

Section 7. It shall be unlawful to operate a multiple refrigeration system until the system has been inspected and a certificate of approval posted.

MACHINERY TO BE APPROVED.

Section 8. No multiple refrigeration system shall be approved unless the refrigeration machinery has been inspected and tested and approved either by the Underwriters' Laboratories or by the Bureau of Buildings.

INSTRUCTIONS TO BE POSTED.

Section 9. Instructions covering the operation and maintenance of the system and what to do in emergencies shall be framed under glass and permanently posted at riser control valves. Such instructions shall include a diagrammatic sketch of the systems with the parts labeled for reference. Exposed refrigerant piping or exposed enclosures carrying refrigerant lines shall be conspicuously marked or labeled plainly so as to indicate its contents at intervals not over 25 feet with metal tags having indented or raised letters.

LIMIT OF SIZE.

Section 10. No multiple refrigeration system shall contain more than 100 pounds of refrigerant.

LOCATION OF COMPRESSOR.

Section 11. No compressor of a multiple refrigeration system shall be located under a stairway or in any room within which is stored combustible material or less than ten (10) feet measuring horizontally from a dumb waiter shaft or an elevator shaft. Such compressor shall be located as nearly beneath the riser as practicable and shall be located in an accessible part of the building, with adequate lighting facilities and shall be protected against mechanical injury by a non-combustible partitions, or by a heavy metal netting secured to metal posts.

INSTALLATION OF REFRIGERANT PIPING.

Section 12. Refrigerant piping shall be installed in accordance with either of the following methods:

First — Approved annealed seamless copper tubing having a thickness of not less than .034 inch wall thickness, with a diameter not exceeding five-eighths (⅝) inch. Such copper tubing shall be protected from mechanical injury by installing the same in iron or steel pipe or similar approved metal enclosure. Such enclosure shall be provided with suitable metal boxes at the manifold and shall have suitable metal boxes for all valves except those at the evaporator. Flexible metal enclosures may be used at bends or terminals if not exceeding six (6) feet in length, provided that they are rigidly fastened to connecting pipe and/or valve boxes. Enclosures shall be rigidly secured to the walls or to other supports at intervals not exceeding ten (10) feet.

Second—Brass pipe having dimensions corresponding with those given in the following table may used:

Nominal Size	Internal Diameter	Exterior Diameter	Thickness
⅛"	.269	.405	.068
¼"	.364	.540	.088
⅜"	.493	.675	.091
½"	.622	.840	.109
¾"	.824	1.05	.113

Brass pipe need not be protected by conduit. Each run of pipe shall be sealed or plugged at each junction box inlet with a material not affected by moisture or the temperature of the line. All tubing shall be independently supported in such a manner as to prevent excessive vibration or strains at joints and connections. Valves, service connections and joints in tubing shall be rigidly secured in suitable metal boxes at accessible places. Refrigerant piping shall not be run in elevator or dumb waiter or other shafts containing moving objects.

REGULATIONS FOR JOINTS.

Section 13. Pipe joints shall have standard threads and shall be made of materials suitable to the refrigerant used.

If flanged fittings are used for pipe connections they shall be of recessed gasket type.

All joints in copper tubing shall be of sweated types, except that flared joints may be used for tubing not larger than five-eighths (⅝) of an inch in diameter. All joints in tubing shall be located in such a manner as to be accessible.

REQUIREMENTS FOR VALVES AND FITTINGS.

Section 14. All valves and fittings of a multiple refrigeration system shall be of the forged type.

Shut-off valves shall be installed at each service outlet on pressure and return lines, and on each riser or manifold connection at or near the compressor. Such valves shall be fitted with a hand wheel or with other means providing operation. Valves in service connections shall be located outside of and within six (6) feet of the refrigerating unit, and such a distance above the floor as will provide ready accessibility.

Shut-off valves shall be installed in both connections to every evaporator in such a manner as to permit the removal of the evaporator with valves attached.

INSTALLATION OF SERVICE CONNECTIONS.

Section 15. Not more than a single evaporator shall be supplied from an outlet box on a main riser. Such outlet box shall be located within the premises of the tenant served and so arranged as to be accessible at all times. Not more than one (1) family or apartment shall be served by one evaporator, except the twin type evaporator serving two apartments may be used if each apartment has shut-off valves for the evaporator.

No outlet or junction box shall be permitted in any hallway, stairway or vertical shaft not cut off at each story.

INSTALLATION OF REFRIGERATION OR CABINET.

Section 16. Each refrigerator or cabinet shall be rigidly secured in place. Except in a non-residential building, each evaporator shall be constructed of sufficient strength to withstand injury in ordinary use, or shall be protected by a suitable shield against such injury.

SAFETY REQUIREMENTS.

Section 17. Each compressor drive shall be provided with an approved device which will automatically stop the compressor at a pressure not in excess of the values given in the following table:

Refrigerant Used	Maximum Pressure in pounds per square inch
Methyl Chloride	150
Sulphur Dioxide	135
Iso-butane	130
Butane	75
Ethyl Chloride	50
Methylene Chloride	15

This requirement shall not apply to air-cooled or to water-cooled machines having a liquid receiver capacity of less than 12 pounds of refrigerant and which are so designed as not to permit a pressure in excess of the test pressure.

PENALTY.

Section 18. Any person violating any provision of this Code, or failing to comply with any requirements thereof, shall, upon conviction thereof in the Municipal Court, be punished by a fine not to exceed five hundred dollars ($500.00) or by imprisonment in the city jail not to exceed six months, or by both such fine and imprisonment.

Section 19. Inasmuch as this ordinance is necessary for the immediate preservation of the public health, peace and safety of the City of Portland in this: That the health and security of the public is in jeopardy because of the hazard that exists in connection with the improperly installing of piping for refrigeration in multiple refrigeration installation; therefore, an emergency is hereby declared to exist and this ordinance shall be in force and effect from and after its passage by the Council.

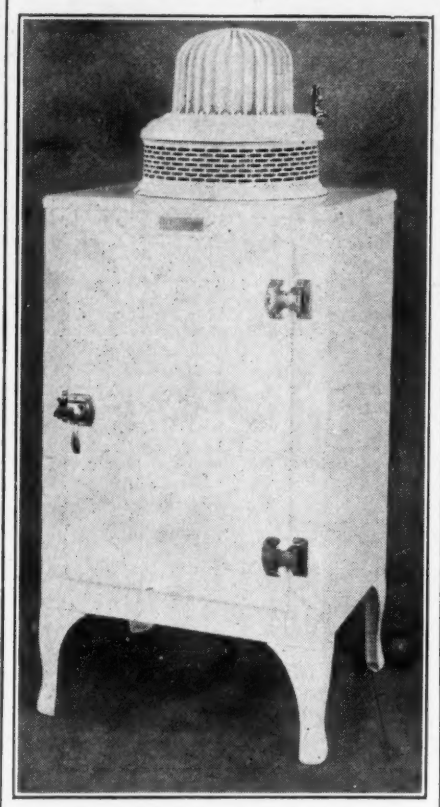
Passed by the Council Nov. 27, 1929.

GEO. L. BAKER,
MAYOR OF THE CITY OF PORTLAND.

ATTEST:

GEO. R. FUNK,
AUDITOR OF THE CITY OF PORTLAND.

"The Capitol"



FLEXIBLE installation is a feature of this new Williams Ice-O-Matic "Capitol" model. The unit can be mounted on the top, at the side, or inside the cabinet or installed in the basement. It is equipped with a cold control for quick freezing.

THE REFRIGERATION INDUSTRY OF 1930

Annual Directory of Manufacturers

THIS annual Directory covers the refrigeration industry, including complete automatic refrigeration systems, domestic and commercial cabinets, materials, parts and accessories, production and service tools, store equipment and related merchandise. It is divided into two sections. The first section, beginning on Page 35, lists in alphabetical order the names of manufacturers, giving the company officers and the products made.

The second section, beginning on Page 44, is arranged according to products, giving under each classification the names of manufacturers.

A

Abbott Ball Co., Hartford, Conn.
Burnishing equipment.

Absopure Refrigeration Corp.,
1560 Theodore St., Detroit, Mich.
David A. Brown, pres.; Harry J. Redwood, vice-pres.; E. E. von Rosen, secy. and treas.; Hiram M. Browne, gen. mgr.; M. C. Burnside, director of sales; Harry C. Hayes, chief engr.; G. Roy Ohmart, ass't. chief engr.; T. S. Pendergast, service mgr.
Trade name.....**Absopure**
Complete electric refrigeration systems, commercial and domestic, including models for multiple installations, complete ice cream cabinets and water coolers.
High Side
Standard size—7. Drive V-Belt.
Compressor—Reciprocating. Seal—Bellows.
Motor—1/6 to 1½ hp.
Control—Pressure and temperature.
Make—American Radiator, Penn. & Ranco.
Method of cooling—Air and water.
Water valve—Electric. Make—American Radiator.
Condenser—Radiator type, plain tube.
Refrigerant—Methyl chloride.
Capacities (ice melting)—110 to 1250 lbs.
Low Side
Standard sizes—50. Expansion valve—Bellows.
Dry or flooded system. Float valve—Low side.
Method of cooling—Direct or indirect.
Capacities—3 to 3600 cu. ft.
Freezing trays—2 to 16. Ice cubes—42 to 3360.
(See Advertisement on Page 30)

Acme-Detroit Saw Corp.,
528 E. Fort St., Detroit, Mich.
Saw sharpners and saws.

Acme Diamond Tool Co.,
172 Broadway, New York, N. Y.
Diamond tools.

Acme White Lead & Color Works,
8250 St. Aubin St., Detroit, Mich.
Trade name ..... **Acme**
Lacquers and white lead.

Acorn Opalite Metal Specialties Co.,
1052 W. Monroe St., Chicago, Ill.
Oscar Kuffe, pres. and gen. mgr.; M. H. Feulner, vice-pres.; M. A. Kuffer, secy. and sales mgr.
Trade name.....**Acorn**
Commercial refrigeration cabinets for restaurants.

Aetna Rubber Co., Ashtabula, Ohio,
F. R. Jefferys, asst. sales mgr.
Trade name ..... **Rubberware**
Rubber sleeves, lid collars, brine stoppers and ice cream cabinet top hole sections. Special refrigeration insulation.
(See Advertisement on Page 47)

Aeroil Burner Co., Inc.
Park Ave. at 13th St., West New York, N. J.
George P. Kittel, pres.
Asphalt heaters and cork dipping pans.

Ajax Bolt & Screw Co.,
6623 Gratiot Ave., Detroit, Mich.
Paul J. Dirksen, pres. and gen. mgr.
Screws, bolts, nuts, washers, taper pins, woodruff keys, studs and special screw machine parts.

Alaska Refrigerator Corp., Muskegon, Mich.
J. L. Gillard, pres. and gen. mgr.; B. R. Gordon, vice pres.; F. J. Enlaw, secy.; J. L. Collin, sales mgr.; Thos. F. Hughes, sales promotion mgr.; R. B. Case, production mgr.; D. A. Sholtens, purchasing agt.
Trade name.....**Alaska**
Domestic refrigeration cabinets, sizes.....23
Food capacities.....3.85 to 16.5 cu. ft.
Construction ..... Wood
Finish (exterior)...Porcelain, lacquer or enamel
Finish (interior).....Porcelain or enamel
(See Advertisement on Page 31)

Albatross Steel Equipment Co.,
Los Angeles, Calif.
R. E. Cornish, pres.
Trade name.....**Chillwell**
Domestic refrigeration cabinets (apartment types, 2 sizes)
Construction ..... Steel
Insulation ..... Corkboard
Finish .....Baked enamel

Allegheny Steel Co., Breckenridge, Pa.
O. M. Otte, eng.
Sheet steel, Allegheny Metal and stainless, seamless tubing.

Allen-Bradley Co.,
494 Reed St., Milwaukee, Wis.
F. F. Loock, gen. sales mgr.
Automatic motor starting switches and motor overload breakers.

Allen Filter Co., Toledo, Ohio.
Water cooler cabinets, automatic glass fillers and drinking fountains.

Allied Products Corp.,
Victor Peninsular Division, 4646 Lawton, Detroit, Mich.
F. E. Wilson, sales dept.
Trade name.....**Victor-Hi-Tensil**
Standard, alloy steel, Monel metal, brass and stainless iron cap screws.

Allied Store Utilities Co., Hussman Refrigerator Division.
911 N. Broadway, St. Louis, Mo.
J. E. Riley, pres.; D. C. McCord, vice pres.; Sol Henoch, vice pres.; Paul E. Weeke, secy. and treas.
Gruendler Refrigerator Division
814 N. Broadway, St. Louis, Mo.
Ligonier Refrigerator Division, Ligonier, Ind.
Commercial wall and walk-in coolers, display cases and special built refrigerators.
(See Advertisement on Page 33)

Almond Mfg. Co., T. R.
Maple Ave., Ashburnham, Mass.
C. A. Hubbell, treas.
Trade name.....**Almond**
Drill and lathe chucks.

Aluminum Co. of America,
Oliver Bldg., Pittsburgh, Pa.
Trade name ..... **Alcoa**
Aluminum base metal.
Bronze powder, aluminum, castings, die castings, draw press products, flat sheet, forgings, machine screws, moulding, nails, paint powder, pipe, pipe fittings, rivets, sand castings, screw machine products, strip and strong alloys.

American Brass Co.,
414 Meadow St., Waterbury, Conn.
Trade name ..... **Anaconda**
Brass, bronze and Ambrac in sheets, rods and strips for condensers, hardware and trimmings. Brass, bronze and Ambrac forgings and die pressed parts, including valves, fittings, hardware, etc. Copper and copper alloy tubes. Everdur metal rods, tubing sheets, tings, hardware, etc. Everdur metal rods, forgings and die pressed parts for valves and other parts which come in contact with acids and refrigerants. Everdur for screws and bolts, Everdur is a copper-silicon-manganese alloy containing no zinc.
(See Advertisement on Page 14)

American Car & Foundry Co.,
30 Church St., New York, N. Y.
Ice cream cabinets.

American Electric Switch Corp., Minerva, Ohio.
Service switches.

American Emery Wheel Works, Providence, R. I.
Grinding wheels, oil stones and emery wheel dressers.

American Engineering Co.,
Aramingo Ave. & Cumberland St., Philadelphia, Pa.
M. Alpern, pres.; W. V. Sauter, vice pres.; J. G. Worker, gen. sales mgr.; C. L. Cushmore, secy. and treas.; W. S. Gibbs, sales mgr., Juruick div.; H. S. Thoenebe, adv. mgr.; H. E. Preston, chief engr.; H. A. Peck, works mgr.; E. W. Sharninghausen, purchasing agt.
Trade name.....**Juruick**
Complete commercial refrigeration systems.
High Side
Standard sizes—6. Drive—V-belt or flat belt.
Compressor—Reciprocating. Seal—Metallic.
Method of cooling—Water. Water valve—Pressure.
Condenser—Shell and tube. Motor—½ to 10 hp.
Refrigerant—Ammonia. Control—Temperature.
Capacities (ice melting)—¼ to 5 tons.
Low Side
Method of cooling—Direct or indirect.
Dry or flooded systems. Float valve—High or low side.
Expansion valve—Diaphragm. Make—Alco.
(See Advertisement on Page 14)

American Hammered Piston Ring Co.,
Bush & Hamburg Sts., Baltimore, Md.
Piston rings.

American Ice Machine Co.,
117 N. Maryland Ave., Glendale, Calif.
Trade name.....**American**
Complete refrigeration systems.
High Side
Compressor—Reciprocating. Drive—Belt.
Seal—Metallic packing, sylphon bellows.
Motor—1/6 to 10 hp.
Control—Pressure and temperature.
Method of cooling—Air and water.
Condenser—Shell and tube, finned.
Refrigerant—Argonium, heliox.
Capacities (ice melting)—100 lbs. to 5 tons.
Low Side
Method of cooling—Direct or indirect.
Dry or flooded systems. Float valve—Low side.
Expansion valve—Diaphragm and bellows.
Freezing trays—2 to 4. Ice cubes—30 to 60.

American Ice Machine Co., Glendale, Calif.
Trade name..... **Snowbird, American**
Domestic refrigeration cabinets

American Insulated Wire & Cable Co.,
954 W. 21st St., Chicago, Ill.
Insulated wire and cable.

American Metal Hose Co.,
Waterbury, Conn.
Flexible hose and tubing.

American Nut Co.,
676 W. Grand Blvd., Detroit, Mich.
Steel, brass and bronze nuts.

American Radiator Co.,
Industrial Division, 816 S. Michigan Ave., Chicago, Ill.
I. J. Knudson, sales engr., New York city; R. E. Townsend, sales engr., Chicago.
Trade name.....**American**
Automatic and thermostatic expansion and float valves and cooling sections complete with trays.
Acessories Division, 40 W. 40th St., New York, N. Y.
Trade name.....**Mercoid**
Refrigeration temperature or pressure controls with or without high pressure cutouts and water valves.
(See Advertisements on Pages 8 and 12)

American Rolling Mill Co.,
703 Curtis St., Middletown, Ohio.
F. A. Tobitt, mgr. ingot iron sales.
Trade name ..... **Armco**
Ingot iron enameling sheets.

American Solder & Flux Co.,
2910 N. 16th St., Philadelphia, Pa.
Soldering paste, salts and liquid. Special flux and solder.

Anchor Brass Foundries,
1431 Church St., Detroit, Mich.
Copper hammers.

Anderson Showcase Mfg. Co.
321 N. E. Filmore St., Minneapolis, Minn.
Trade name..... **Anderson**
Domestic refrigeration cabinets
Contruction ..... Wood
Insulation .....Corkboard
Finish (interior)..... Enamel
Commercial wall and walk-in coolers and display cases.

Ansul Chemical Co., Marinette, Wis.
H. V. Higley, secy. and director of sales.
Trade name ..... **Ansul**
Sulphur dioxide.
(See Advertisement on Page 12)

Apex Regulator Co.,
508 South Third Ave., Marshalltown, Iowa.
Trade name.....**Apex**
Expansion valves, water pressure control regulators and strainers.

Appleton Electric Co.,
1701 Wellington Ave., Chicago, Ill.
Trade name ..... **Unilets**
Conduit fittings.

Arcade Mfg. Co.,
1212 E. Shawnee St., Freeport, Ill.
Trade name ..... **Arcade**
Automatic cold storage locks. Cold storage strap iron hinges. Automatic locks for wall and walk-in coolers. Cast brass and bronze hinges.

Arctic-Aire Co.,
Munsey Bldg., Baltimore, Md.
Commercial water cooling units.

Arlington Refrigerator Co., Arlington, Vt.
Trade name.....**Arlington, Arco, Arco-Stone**
Refrigeration cabinets.

Armour & Co., Chicago, Ill.
Anhydrous ammonia.

Armstrong Brothers Tool Co.,
317 N. Francisco St., Chicago, Ill.
Pipe tools, machinist tools.

Armstrong Cork & Insulation Co.,
Lancaster, Pa.
S. C. Martin, sales mgr.
Trade name ..... **Armstrong**
Corkboard insulation. Cork covering for low temperature lines.
(See Advertisement on Page 34)

Armstrong Machinery Co., Inc.,
3201 E. Riverside, Spokane, Wash.
Trade name.....**Armstrong**
Complete refrigeration systems.
High Side
Compressor—Reciprocating. Drive—Belt.
Seal—Ring Method of cooling—Water.
Condenser—Pipe. Motor—¼ to 50 hp.
Control—Temperature and pressure.
Refrigerant—Ammonia.
Capacities (ice melting)—20 lbs. to 20 tons.
Low Side
Method of cooling—Direct or indirect.

Atlas Plywood Corp.,
Park Square Bldg., Boston, Mass.
Trade name.....**Atlas**
Packing cases.

Auburn Button Works, Inc., Auburn, N. Y.
Custom moulders of Bakelite and celluloid, celluloid sheets and rods.

Audiffren Refrigerating Machine Co.,
285 Madison Ave., New York, N. Y.
Trade name.....**Audiffr**
Complete refrigeration systems.
High Side
Compressor—Reciprocating. Drive—Belt.
Seal—Hermetic. Method of cooling—Air and water.
Condenser—Rotating drum. Motor—⅓ to 7½ hp.
Control—Temperature.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—20 lbs. to 3 tons.
Low Side
Method of cooling—Indirect.
Ice Cubes—28 to 600.

Aurora Metal Cabinet Works, Aurora, Ill.
Ice cream and soft drink dispensing equipment luncheonettes, candy and window display case for mechanical refrigeration.

Autodrink Corp.,
245 Fiifth Ave., New York, N. Y.
Beverage coolers.

Automatic Freezer Corp.,
63 N. Howell, Hillsdale, Mich.
Geo. A. Robertson, pres.; G. F. Sullivan, vice pres. and sales mgr.; J. J. Hogan, secy. and treas.; L. C. Smith, chief engr.; F. K. Smith production mgr.
Trade name.....**Carefree**
Complete refrigeration systems, including models for ice cream cabinets.
High Side
Standard sizes—2. Seal—Sylphon.
Compressor—Reciprocating. Drive—Belt.
Motor—⅓ to 1/6 hp. Make—Century.
Control—Temperature. Make—Penn.
Method of cooling—Air. Condenser—Radiator type.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—150 to 350 lbs.
Low Side
Standard sizes—6 Flooded system.
Method of cooling—Direct or indirect.
Float valve—Low side. Make—Smith.
Capacities—5 to 100 cu. ft.
Freezing trays—2 to 12. Ice cubes 32 to 192.

Automatic Products Co.,
1145 W. Grand Blvd., Detroit, Mich.
E. F. Schneider, sales mgr.
Cap screws and special screw machine parts.

Automatic Reclosing Circuit Breaker Co.,
Sixth & Wesley Sts., Columbus, Ohio.
Thermostats, magnetic switches, automatic reclosing circuit breakers, starters, contactors and relays.

Automatic Refrigerating Co., Inc.,
618 Capitol Ave., Hartford, Conn.
Automatic expansion and thermostatic expansion valves, solenoid liquid ammonia valve, high pressure cut-off and back pressure regulator.

Avey Drilling Machine Co., Cincinnati, Ohio.
D. A. Patterson, secy.
Trade name.....**Avey**
Multiple spindle and automatic drill presses, cutting off machine, metal cutting saws and vises.

B

Baker Bros., Toledo, Ohio.
Drill presses.

Baker Ice Machine Co., Inc.,
Evans and 16th St., Omaha, Nebr.
High Side
Complete refrigeration systems.
Standard sizes—11. Motor—½ to 100 hp.
Compressor—Reciprocating. Drive—V-belt.
Control—Pressure and temperature.
Method of cooling — Water. Water valve—Pressure.
Refrigerant—Ammonia and methyl chloride.
Capacities (ice melting)—500 lbs. to 70 tons.

Baldor Electric Co.,
4351 Duncan Ave., St. Louis, Mo.
Trade name ..... **Baldor**
Single phase, repulsion-induction and single phase, high torque, brushless condenser type motors. Direct current and polyphase motors.

Baldwin Refrigerator Co., Burlington, Vt.
Refrigeration cabinets.

Balsa Wood Co.,
158 Pioneer St., Brooklyn, N. Y.
Jas. T. Downey, vice pres.
Trade name.....**Lata Balsa**
Insulation lumber.

Banta Refrigerator Co., Clearfield, Pa.
L. A. Banta, pres.; W. J. Walker, vice-pres. and gen. mgr.; L. J. Irwin, secy.; F. B. Kerr, treas.; A. L. Starkey, chief engr.; G. F. Banta, prod. mgr.; W. G. McBride, pur. agt.
Trade name ..... **Banta**
Commercial refrigeration cabinets, wall and walk-in coolers and display cases.

Barostat Co., 141 Milk St., Boston, Mass.
B. L. Chapin, treas.
Trade name ..... **Barostat**
Snap action valves and snap action switches.
(See Advertisement on Page 43)

Bassick Co., 38 Austin St., Bridgeport, Conn.
Casters.

Bastian-Blessing Co.,
240 E. Ontario St., Chicago, Ill.
Soda fountains.

Batavia Clamp Co., Inc.,
Chas. W. Gardiner pres.
297 Center St., Batavia, N. Y.
Clamps.

Beaver Manufacturing Co.,
625 North Third St., Newark, N. J.
Trade name.....**Beaver**
Armored and unarmored motor base and connector, sockets, switches, connectors and safety handle caps.

Belden Mfg. Co.,
2300 South Western Ave., Chicago, Ill.
Russell Koenitzer, asst. adv. mgr.
Trade name ..... **Belden**
Portable cords equipped, soft rubber plugs and connectors.

Belding-Hall Co., Belding, Mich.
Trade name .....**Belding-Hall**
Domestic refrigeration cabinets.....19
Food capacities.....4 to 15 cu. ft.
Construction ..... Steel
Insulation ..... Corkboard
Hardware.....Grand Rapids Brass
Gaskets .....Bosley and Jarrow
Finish (exterior).....Porcelain and lacquer
Finish (interior).....Porcelain and enamel
Commercial wall and walk-in coolers and display cases.

Charles H. Besley & Co.,
118 Clinton St., Chicago, Ill.
Taps, abrasives.

Benjamin Electric Mfg. Co.,
111 No. Canal St., Chicago, Ill.
W. D. Steele, pres.; R. B. Benjamin, vice pres.; C. F. W. Alfvin, secy. and treas.; G. B. Weber, sales mgr.; R. W. Staud, adv. mgr.; E. D. Pellegrin, sales and designing engr.; H. A. Varnell, purchasing agt.
Trade name .....**Crysteel**
Domestic refrigeration cabinets, sizes.....14
Food capacities.....3.5 to 20 cu. ft.
Construction ..... Steel
Insulation.....Corkboard, Dry-Zero, Celotex
Hardware ..... Grand Rapids Brass
Gaskets ..... Bosley
Finish (exterior) .....Porcelain
Finish (interior) .....Porcelain

Berry Bros., 211 Lieb St., Detroit, Mich.
D. R. Anderson, Berryloid Div.
Trade name ..... **Berryloid**
Lacquers, enamels and rustproofing materials.

Binks Spray Equipment Co.,
3114-16 Carroll Ave., Chicago, Ill.
Paint spraying equipment.

Bishop & Babcock Sales Co.,
4901 Hamilton Ave., N. E., Cleveland, Ohio.
Trade name ..... **Thermolectric, Red Cross**
Switches for pressure or temperature control, seamless metal bellows. Also make soda fountains.

Black Bros. Co., Inc.,
401 Ninth Ave., Mendota, Ill.
L. E. Black, sales mgr.
Gluing and veneering equipment, including clamps, pots, clamp carriers, boilers, heaters, mixers, spreaders, presses and veneer taping machines.

Black & Decker Co., Towson, Md.
W. C. Allen, sales mgr.
Electric grinders, screw drivers, finishers, drills, soldering irons, bolt setters, stud drivers.

G. S. Blakeslee & Co.,
19th and 52nd Aves., Cicero, Ill.
John W. Dammers, secy.
Industrial metal parts washing and drying equipment.

Blazek Cold Storage Door Co.,
2232 West Lake St., Chicago, Ill.
Harry H. Dobry, vice pres.
Trade name.....**Blazek**
Cooler, freezer, bunker, track service and metal clad doors. Refrigerator and mortuary fronts. Cold storage and service windows. Ice cream and milk can passing doors.

E. W. Bliss Co., Brooklyn, N. Y.
Punch presses, shears.

Bliss Co., E. W., Salem, Ohio.
Trade name ..... **Neibling**
Commercial refrigerating machines.

Bohn Aluminum & Brass Corp.,
R. R. Arnold, div. sales mgr.
2512 East Grand Blvd., Detroit, Mich.
Line and shut-off valves, brass forgings, die castings, flared tube nuts, forged and die cast hardware.

Bohn Refrigerator Co.
1350 University Ave., St. Paul, Minn.
Trade name .....**Bohn**
Domestic refrigeration cabinets, sizes.....6
Food capacities.....5 to 12 cu. ft.
Construction .....Steel and Wood
Insulation .....Flaxlinum
Finish (exterior).....Porcelain
Finish (interior).....Porcelain
(See Advertisement on Page 14)

Bolton & Hay, 216 Second St., DesMoines, Iowa
H. O. Hay, pres.; L. M. Bolton, sales mgr.
Commercial refrigeration cabinets and restaurant and cafe combination ice cream cabinets with bottled goods compartment.

Borden Co., A. E., 110 High St., Boston, Mass.
Fittings and copper tube.
(See Advertisement on Page 47)

Bosley Co., D. W.,
1901 Carroll Ave., Chicago, Ill.
H. E. Hempel, secy.
Trade name.....**Bosley's**
Door gaskets.
(See Advertisement on Page 34)

Bower Roller Bearing,
3040 Hart Ave., Detroit, Mich.
W. S. Bennett, sales mgr.
Roller bearings.

Boydell Bros.,
432 E. Lafayette St., Detroit, Mich.
Paints, varnishes and lacquers.

Bozman & Bros., Inc., R. H.
1046 Granby St., Baltimore, Md.
R. H. Bozman, pres. and sales mgr.; O. P. Bozman, vice pres.; E. D. Bozman, secy. and treas.; F. Y. McKinstry, chief engr. and purchasing agt.
Commercial wall and walk-in coolers and display cases.

Bradley-Hurtz Co.,
2713 S. Dearborn St., Chicago, Ill.
F. J. Hurtz, vice pres.
Lacquers and enamels.
(See Advertisement on Page 38)

Brenner Co., Inc., Alphonse
1229 Texas Ave., Shreveport, La.
Trade name.....**Brenner**
Complete refrigeration systems.
High Side
Compressor—Reciprocating. Drive—Belt.
Seal—Sylphon. Make—Kulair.
Method of cooling—Air and water.
Condenser—Fin type. Motor—Wagner 1/6 to 1½ hp.
Control—Pressure and temperature. Make—Penn., Ranco.
Refrigerant—Sulphur Dioxide.
Capacity (ice melting)—40 to 1200 lbs.
Low Side
Standard sizes—7. Flooded system.
Float valve—Low side. Make—Fedders.
Capacities—5 to 50 cu. ft.
Freezing trays—2 to 5. Ice cubes—56 to 140.

Bridgeport Brass Co.,
774 East Main St., Bridgeport, Conn.
Cold forged compression nuts, bellows and thermostatic devices, boilers, condensers, float balls, special brass and copper shells and special blanked and formed parts.
(See Advertisement on Page 42)

Bridgeport Safety Emery Wheel Co., Inc.,
P. O. Box 2031, Bridgeport, Conn.
Face grinder for flat surfaces, floor grinder and polishing stands and tool grinders.

Bright Co., George B.
2615 12th St., Detroit, Mich.
Engineering and testing service.
(See Advertisement on Page 47)

Bristol Co., Waterbury, Conn.
Testing instruments.

Brooks Cabinet Co., Inc.
1028 W. 27th St., Norfolk, Va.
Trade name .....**Brooks**
Domestic and Commercial refrigeration cabinets.

Brown Instrument Co., Philadelphia, Pa.
Indicating and recording thermometers, flow meters, pressure and liquid level gauges.

Brown & Sharpe Mfg. Co.,
Promenade St., Providence, R. I.
Milling, grinding, screw and gear cutting and hobbing machiines, small tools and cutters.

Brunswick-Kroeschell Co., New Brunswick, N. J.
Trade name.....**Brunswick; Kroeschell**
Complete refrigeration systems.
High Side
Compressor — Reciprocating. Drive — Belt or direct.
Control—Manual and automatic.
Method of cooling—Water.
Water valve—Pressure.
Condenser—Double pipe, shell and tube.
Refrigerant—Ammonia and carbon dioxide.
Capacities (ice melting)—¼ ton and up.
Low Side
Method of cooling—Direct and indirect.
Expansion valve—Diaphragm.

Bryant Electric Refrigerator Corp.,
New Milford, Pa.
Trade name.....**Bryant**
Complete refrigeration systems.
High Side
Standard sizes—7. Drive—Belt.
Compressor—Reciprocating. Seal—Bellows.
Motor 1/6 to 1½ hp. Make—Century.
Control—Temperature. Make—Ranco.
Method of cooling—Air, water. Water valve—electric.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—145 to 800 lbs.
Low Side
Flooded systems. Method of cooling—Direct.
Float valve—Low side. Make—Fedders.
Capacity—4 to 50 cu. ft.
Freezing trays—2 to 20. Ice cubes—20 to 400.

Buckeye Twist Drill Co., Alliance, Ohio.
Drills, reamers, cutters.

Buhl Stamping Co.,
2730 Scotten Ave., Detroit, Mich.
Metal stampings. Flaring tools, punches.

Bullard Co.,
Brewster St. and Canfield Ave., Bridgeport, Conn.
Machine tools.

Bury Compressor Co.,
1100 W. 17th St., Erie, Pa.
Air compressors.

Bush Mfg. Co.,
100 Wellington St., Hartford, Conn.
Seamless copper tubing condensers with individual fins.
(See Advertisement on Page 19)

Buyers Door & Mfg. Co., Ltd.,
374 Pacific Ave., Toronto, Ont., Canada.
Trade name .....**Arctic**
Commercial refrigeration cabinets.

C

Cabot, Inc., Samuel, 141 Milk St., Boston, Mass.
Trade name ..... **Cabot's Quilt**
Insulating quilt. (Basic material, eel grass.)

Calco Chemical Co., Bound Brook, N. J.
S. C. Moody, dept. sales mgr.
Trade name.....**Calco**
Sulphur dioxide.

California Electric Refrigerators, Inc.,
5th & Dwight, Berkeley, Calif.
Trade name.....**Calectro Frost**
Complete refrigeration systems.
High Side
Standard sizes—7. Drive—V-belt.
Compressor—Reciprocating. Seal—Bellows.
Motor 1/6 to 1½ hp. Make—Century.
Control—Pressure.
Method of cooling—Air. Condenser—Radiator type.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—35 to 500 lbs.
Low Side
Standard sizes—10. Flooded system.
Method of cooling—Direct. Float Valve—Low side.
Capacities—4 to 15 cu. ft.
Freezing trays—2 to 5. Ice cubes—30 to 75.

Calvert Electric Refrigeration Co.,
Woodberry, Baltimore, Md.
S. P. Brady, Sr., pres.; Dudley Shoemaker, vice pres. and gen. mgr.; R. W. Alexander, secy. and treas.; E. H. Hardesty, sales mgr. and adv. mgr.; N. S. Otey, chief engr.; Clarence Heubeck, production mgr.; C. C. Bartlett, purchasing agt.
Trade name.....Calvert
Complete refrigeration systems.
High Side
Standard sizes—5. Drive—Belt.
Compressor—Reciprocating. Seal—Metallic.
Motor—1/4 to 1½ hp. Make—Century and G. E.
Control—Pressure.
Method of cooling—Air. Condenser—Radiator type.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—150 to 1000 lbs.
Low Side
Standard sizes—5. Dry system.
Method of cooling—Direct. Float valve—High side.
Capacities—5 to 50 cu. ft.
Freezing trays—4 to 10. Ice cubes—64 to 160.

Cameo Refrigerator Corp.,
2151 E. 51st St., Los Angeles, Calif.
J. T. Penton, pres.; R. B. Ahlswede, vice-pres.; E. E. Radeck, gen. mgr. and treas.; N. W. Neice, secy. and sales mgr.; R. N. Walters, prod. mgr. and pur. agt.
Trade name .....Cameo
Domestic refrigeration cabinets, sizes.....7
Food capacities.....3 to 8 cu. ft.
Construction.....Wood, Metal
Insulation ..... Corkboard
Hardware..Grand Rapids Brass, National Lock
Gaskets..... Wirfs, Dennis
Finish (exterior).....Enamel, porcelain
Finish (interior).....Enamel, porcelain

Campbell Refrigerator Co.,
3200 Auer Ave., Milwaukee, Wis.
R. F. Campbell, pres. and gen. mgr., G. Vierheilig, vice pres.; G. C. Kohlhardt, secy. and treas.; Earle Campbell, sales mgr.; Basil Buechler, production mgr.; H. R. Nielsen, purchasing agt.
Trade name..... Campbell
Commercial wall and walk-in coolers, display cases, mortuary, hospital and florist refrigeration cabinets.

Carbo-Freezer Co., Inc.,
14 W. 42nd St., New York, N. Y.
Trade name ..... Carbofrost
Carbon dioxide ice.

Carbondale Machine Co., Carbondale, Pa.
Trade name.....Carmaco
Complete refrigeration systems.
High Side
Compressor—Reciprocating. Drive—Tex rope.
Motor—3 to 7½ hp. Control—Temperature, pressure.
Method of cooling—Water. Condenser—Tubular.
Water valve—Pressure.
Capacity (ice melting)—1 to 4 tons.
Low Side
Method of cooling—Direct or indirect.
Expansion valve—Diaphragm.

Carroll Glass Instrument Co., Philadelphia, Pa.
Thermometers.
(See Advertisement on Page 43)

Cash Valve Mfg. Co.,
616 N. Water St., Decatur, Ill.
Water valves.

Carter, Horace A.
16 E. Marshall St., Richmond, Va.
Soda fountains and luncheon equipment.

Celotex Co.,
919 N. Michigan Ave., Chicago, Ill.
Trade name ..... Celotex
Insulation board. (Basic material, cane fibre.)

Central Alloy Steel Corp., Massillon, Ohio.
L. S. Hamaker, adv. mgr.
Trade name ..... Toncan
Iron sheets. Enduro stainless irons.

Century Electric Co.,
1806 Pine St., St. Louis, Mo.
Trade name ..... Century
Single phase repulsion start induction motors, split phase induction motors, automatic start induction polyphase motors, normal starting current normal torque squirrel cage induction polyphase motors, low starting current normal torque squirrel cage induction polyphase motors and direct current motors.
(See Advertisement on Page 16)

Century Saw & Tool Works,
1567 Church St., Detroit, Mich.
Files, tools, saws.

Chase Brass & Copper Co., Waterbury, Conn.
Trade name ..... Chase
Seamless copper tubing.

Champion Electric Co.,
N. Paulina & Diversey Pky., Chicago, Ill.
Complete refrigeration systems.

Champion Refrigerator Co., Inc.,
206 Lexington Ave., New York, N. Y.
Domestic refrigeration cabinets.

Chester Dairy Supply Co., Chester, Pa.
Milk coolers.

Chicago Flexible Shaft Co.,
1150 S. Central Ave., Chicago, Ill.
Gas furnaces.

Chicago Mill & Lumber Corp.,
111 W. Washington St., Chicago, Ill.
O'Neill Ryan, Jr., gen. sales mgr.; J. J. Kehoe, manager, industrial division.
Trade name.....Weatherwood
Insulation board. (Basis material, hardwood fibres.)

Chicago Pneumatic Tool Co., Detroit, Mich.
H. C. Gilligan, dist. mgr.; G. P. Russel, representative.
Air compressors and vacuum pumps. Electric drills, reamers, grinders, screwdrivers, nut runners and stud setters, pneumatic tools of all kinds.

Chicago-Wilcox Mfg. Co.,
E. 77th St. & Anthony Ave., Chicago, Ill.
E. J. Zoll, secy.
Special metal gaskets.
(See Advertisement on Page 43)

Cincinnati Butchers Supply Co., Cincinnati, O.
Trade name .....Beauty
Commercial refrigeration cabinets.

Cincinnati Grinders, Inc., Cincinnati, Ohio.
Centertype and centerless grinders.

Cincinnati Milling Machine Co., Cincinnati, O.
Knee and column type, automatic and hydromatic milling machines and cutter and tool grinders.

City Machine & Tool Works,
E. 3rd St. and June, Toledo, Ohio.
Tools, dies, jigs, fixtures, gauges and special machinery.

Cleveland Cap Screw Co.,
2917 E. 79th St., Cleveland, Ohio.
Head cap screws, special and hexagon, steel or alloy.

Cleveland Container Co.,
7124 Chatfield Drive, Detroit, Mich.
W. T. Metzger, sales representative.
Paper tubes and cans for protecting small parts in transit.

Cleveland Electric Tramrail, Division of Cleveland crane & Engineering Co., Wickliffe, Ohio.
J. R. Booher, adv. mgr.
Electric cranes, hoists, conveyors and tiering machines.

Cleveland Evaporator Co.,
6400 Breakwater Ave., Cleveland, Ohio.
Evaporator sections.

Clifford Manufacturing Co.,
564 E. First St., Boston, Mass.
John E. Woods, chief engr.
Metal bellows for temperature controls, compressor shaft seals and stuffing boxes. Straight thru and T types, packless valves.

Climax Electrical Refrigeration Co.,
Clinton, Iowa.
E. B. Mallory, pres.; E. F. Deacon, vice-pres.; R. L. Alexander, gen. mgr. and chief engr.; Wm. E. Eberhardt, Jr., treas.; J. N. Palmer, sales mgr.; W. H. Johnson, pur. agt.
Trade name.....Climax
Complete refrigeration systems.
High Side
Standard sizes—8. Drive—Direct and belt.
Compressor—Rotary and reciprocating.
Refrigerant—Ammonia and methyl chloride.
Capacities (ice melting)—75 lbs. to 4 tons.

Collis Co., Clinton, Iowa.
Wire shelving.

Colt's Patent Fire Arms Mfg. Co.,
17 Van Dyke Ave., Hartford, Conn.
Seal rings and safety switches and fuses.

Columbia Products Co., Barberton, Ohio.
Calcium chloride.

Commercial Refrigerator Mfg. Co.,
E. 59th St., Los Angeles, Calif.
N. A. Kessler, pres. and gen. mgr.; George R. Lindahl, vice-pres. and gen. mgr.; A. Gearson, treas.; V. A. McCloud, prod. mgr.; B. Bernstein, pur. agt.
Trade name .....Super-Bilt, Super-Cold
Commercial refrigeration cabinets and display cases.

Commercial Steel Treating Corp.,
6535 Livernois Ave., Detroit, Mich.
Carbonizing cyaniding, tool hardening, annealing, heat treating.

Commonwealth Brass Corp.,
Commonwealth Ave. & G. T. R. R.,
Detroit, Mich.
P. Tazelaar, sales mgr.
Brass flared tube fittings, forged and rod nuts, unions, forged elbows, tees and crosses in standard or special pipe tread and tube end combinations. Brass automatic screw machine parts and forging to specifications.
(See Advertisement on Page 40)

Connecticut Electric Mfg. Co., Bridgeport, Conn.
A. H. Trumbull, pres.; F. S. Trumbull, vice-pres.; H. M. Doyle, secy. and treas.
Bakelite attachment plugs, porcelain cut-outs and switches.

Conn Perry Mfg. Co.,
4341 Horatio Ave., Detroit, Mich.
Screw machine products.

Conn Valley Mfg. Co.,
200 Main St., Centerbrook, Conn.
Expansion bits.

Consolidated Machine Tool Corp., Erie, Pa.
Small tools.

Continental Can Co.,
100 E. 42nd St., New York, N. Y.
Oil cans for shipping service oil.

Continental-Diamond Fibre Co.,
Newark, Dela., and Bridgeport, Pa.
L. W. Tarr, asst. gen. mgr., Newark.
Trade name....Dilecto, Diamond Fibre, Celoron
Vulcanized fibre sheets, rods and tubes, laminated phenolic sheets, rods and tubes, silent gears and gear material, plastic moulding powder.

Continental Rubber Works, Erie, Pa.
Packings, sealing gum, V and flat type belts, pads.

Cooke Electric Refrigeration Co.,
30 N. Green St., Chicago, Ill.
Geo. J. Cooke, pres. and gen. mgr.; Geo. J. Cooke, Jr., vice-pres.; Robert E. Cooke, secy.; Roland W. Barlow, sales mgr.; H. W. Walker, chief engr.
Trade name.....Cerco
Complete refrigeration systems.
High Side
Standard sizes—5. Drive—V-belt.
Compressor—Reciprocating.
Seal—Cooke Seal Ring. Motor—1/6 to 2 hp.
Control—Temperature.
Method of cooling—Air and water.
Water valve—Pressure. Condenser—Tubing.
Refrigerant—Ammonia.
Capacities (ice melting)—125 to 2000 lbs.
Low Side
Dry system. Method of cooling—Direct or indirect.
Capacities—4 to 1500 cu. ft.
Freezing trays—4 to 60. Ice cubes—32 to 480.

Cooke Seal Ring Co.
30 N. Green St., Chicago, Ill.
R. E. Cooke, mgr.
Trade name ..... Cooke Seal
Crankshaft, oil, water and brine pump seals. Replacement seal units. Seals for all liquids and gases-pressure or vacuum on rotating shafts.
(See Advertisement on Page 21)

Cope-Swift Co., Inc.,
247 McDougall Ave., Detroit, Mich.
Cooling fans and cast iron pulleys for V-belts.

Copeland Products, Inc.,
332 Cass Ave., Mt. Clemens, Mich.
Louis Rutherberg, pres. and gen. mgr.; William Robert Wilson, chairman of board; W. D. McElhinny, vice-pres. in charge of sales; Glenn Muffly, chief engr.; Edward Hughes, works mgr.
Trade name.....Copeland
Commercial and domestic electric refrigeration systems including models for multiple installations, milk coolers, water coolers, and ice cream cabinets.
High Side
Standard sizes—13. Drive—Belt.
Compressor—Reciprocating. Seal—Bellows.
Motor—1/6 to 1½ hp. Make—Dayfan.
Control—Pressure and temperature. Make—Bishop & Babcock and Penn.
Method of cooling—Air and water.
Water valve—Pressure.
Condenser—Spiralfin coil and radiator type.
Refrigerant—Iso butane and methyl chloride.
Low Side
Standard sizes—22. Dry or flooded system.
Method of cooling—Direct or indirect.
Expansion valve—Bellows.
Float valve—Low side. Make—Fedders.
Capacities—5 to 20½ cu. ft.
Freezing trays—3 to 12. Ice cubes—108 to 432.

Copper & Brass Research Association,
25 Broadway, New York, N. Y.
Consultant service without charge on all problems concerning the uses and proper application of copper, brass and bronze in mechanical refrigeration.
(See Advertisement on Page 8)

Cordley & Hayes
1 Leonard St., New York, N. Y.
Trade name.....20th Century, Cordley, C & H
Gravity type faucets for inverted bottle water coolers. Pressure type faucets for water coolers. Also make bottle and pressure type water coolers for electric refrigeration.
(See Advertisement on Page 47)

Cork Import Corp.,
345 West 40th St., New York, N. Y.
Trade name ..... Nevoid
Corkboard insulation. Cork pipe covering and fittings for cold lines.
(See Advertisement on Page 40)

Cork Insulating Co., Inc.,
154 Nassau St., New York, N. Y.
Cork insulation.

Cramp Mfg. Co., 2850 Fulton St., Chicago, Ill.
Indicating micrometers.

Crawford Oven Co.,
340 W. Water St., New Haven, Conn.
Enameling ovens, spray booths.

Creamery Package Mfg. Co.,
1243 W. Washington Blvd., Chicago, Ill.
E. W. Chandler, pres.; G. E. Wallis, gen. mgr.; R. F. Davis, secy.; E. K. Deland, treas.; O. P. Heller, sales mgr.; J. H. Godfrey, adv. mgr.; J. C. Scovel, Jr., chief engr.; G. W. Williams, prod. mgr.; R. W. Patrick, pur. agt.
Trade name.....C. P.
Complete refrigeration systems.
High Side
Compressor—Reciprocating. Drive—Belt.
Motor—½ to 7½ hp. Seal—Metal packing.
Control—Temperature. Make—Time-O-Stat.
Method of cooling—Water. Condenser—Plain tube.
Water valve—Pressure. Make—Peerless.
Refrigerant—Ammonia.
Capacities (ice melting)—500 lbs. to 4 tons.
Low Side
Dry or flooded system. Float valve—Low side.
Method of cooling—Direct or indirect.
Expansion valve—Diaphragm.

Crosley Radio Corp.,
3401 Colerain Ave., Cincinnati, Ohio.
Powel Crosley, Jr., pres.; Lewis Crosley, vice-pres.; Walter Evans, secy.; Neal Newman, sales mgr.; Eugene Deaderick, adv. mgr.; Ralph Langley, chief engr.; Avery Aiken, pur. agt.
Trade name.....Icyball
Domestic refrigeration cabinets.
Non-electric, non-automatic, ammonia absorption type unit, the refrigeration cycle being actuated by immersion in hot water.

Crystal Refrigerator Co., Fremont, Nebr.
Frank Hammond, pres.; Earl R. Hammond, secy. and sales mgr.; R. E. Hammond, treas. and pur. agt.; A. F. Lawrence, prod. mgr.
Trade name .....Crystal
Domestic refrigeration cabinets, sizes.....17
Construction .....Steel
Insulation.....Cork and Celotex
Hardware.....Grand Rapids Brass
Finish (exterior) .....Lacquer
Finish (interior) .....Enamel
Commercial wall coolers and display cases.

Crouse-Hinds Co.,
400 Comstock Ave., Syracuse, N. Y.
Switches, condulets.

Crowe Name Plate & Mfg. Co.,
4835 Woodward Ave., Detroit, Mich.
Name plates.

Cushman Chuck Co.,
902 Windsor St., Hartford, Conn.
Lathe chucks.

Cutler-Hammer, Inc.
12th & St. Paul Ave., Milwaukee, Wis.
T. D. Montgomery, mgr. industrial sales.
Electric controls and motor overload breakers, plugs, caps, connectors, etc.

Cyclops Iron Works,
837 Folsom St., San Francisco, Calif.
Trade name.....Cyclops
High Side
Compressor—Reciprocating. Drive—Belt or direct.
Motor—¾ to 350 hp. Seal—Stuffing box.
Control—Manual, pressure or temperature.
Method of cooling—Water.
Water valve—Manual, pressure and temperature.
Condenser—Double pipe, shell and tube, atmospheric.
Refrigerant—Ammonia.
Capacities (ice melting)—1/3 to 300 tons.
Low Side
Dry or flooded system.
Method of cooling—Direct or indirect.
Float valve—Low or high side.

Cyclops Steel Co., Titusville, Pa.
C. T. Evans, vice-pres. and gen. mgr.
High speed steel, special allow tool steels, carbon tool steels, corrosion and heat resisting steels.

D

Paul J. Daemicke Co.,
1340 Fullerton Ave., Chicago, Ill.
Alfred T. Alden, pres.; Frank W. Daemicke, vice-pres.; Edmund H. Eitel, sales mgr. and adv. mgr.
Commercial wall and walk-in coolers and display cases.

Dairy Refrigeration Co.,
311-64th Ave., Milwaukee, Wis.
O. L. Hollister, pres.; E. G. Glenn, vice-pres. and chief engr.; H. A. Hollister, secy. and treas.; J. L. Hollister, adv. mgr.
Trade name.....Glenn
Complete refrigeration systems, including models for milk coolers.
Cooling and storage tanks, dry boxes, aerators, brine tanks and pumps.
High Side
Standard sizes—3. Drive—V-belt.
Compressor—Reciprocating. Seal—Bellows.
Motor—⅓ to 3 hp. Make—Westinghouse, Master.
Control—Temperature. Make—Mercoid.
Method of cooling—Air. Condenser—Fin coil.
Refrigerant—Methyl chloride.
Capacities—300 lbs. to 1 ton.
Low Side
Standard sizes—5. Dry expansion system.
Method of cooling—Direct or indirect.
Expansion valve—Bellows. Make—American.
(See Advertisement on Page 46)

Dallas Brass & Copper Co.,
Division of Revere Copper & Brass, Inc.
620 Orleans St., Chicago, Ill.
Copper and brass sheets, tubing and stampings.

Dayton Rubber Mfg. Co., Dayton, Ohio.
Trade name ..... Dayton
Rubber belts and stoppers, crutch tips for condensing unit bases.

Day and Night Water Heater Co., Ltd.,
2320 E. 8th St., Los Angeles, Calif., Factory at Monrovia, Calif.
Trade name.....Day & Night
Storage type water coolers. Complete water cooling low sides for all makes of electric refrigerating machines.

Deer Co., Inc., A. J.,
Buffalo & West Sts., Hornell, N. Y.
Trade name.....Royal
Complete refrigeration systems.
High Side
Standard sizes—2. Drive—Belt.
Compressor—Reciprocating. Seal—Sylphon.
Motor—½ to ¾ hp.
Control—Pressure. Make—Time-O-Stat.
Method of cooling—Air. Condenser—Radiator type.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—300 to 400 lbs.
Low Side
Standard sizes—18. Dry or flooded system.
Method of cooling—Direct. Float valve—Low side.
Expansion valve—Bellows. Make—American.
Capacities—18 to 120 cu. ft.

Delco Products Corp., Dayton, Ohio.
R. L. Wilkinson, sales mgr.
Fractional horsepower motors.

Dent Hardware Co., Fullerton, Pa.
H. H. Dent, pres.; H. C. Dent, vice-pres.
Trade name ..... Dent
Door hardware.
(See Advertisement on Page 48)

Detroit Brass & Malleable Works,
1177 Holden Ave., Detroit, Mich.
Trade name ..... Fourdee
Brass and malleable iron castings and rod products.

Detroit Butchers Supply Co.,
1455 Gratiot Ave., Detroit, Mich.
Trade name.....Diamond Brand
Commercial display cases.

Detroit Edge Tool Works, Inc.,
3000 E. Woodbridge St., Detroit, Mich.
Shear blades for squaring shears and planer knives for wood working machines.

Detroit Hoist & Machine Co.,
8201 Marrow, Detroit, Mich.
Electric hoists.

Detroit Ice Machine Co.,
12th St. at Pine, Detroit, Mich.
Geo. B. Bright, pres.; Joseph Brutell, vice-pres. and gen. mgr.; Theo. Huetteman, secy. and sales mgr.; L. A. Moeller, treas.; R. C. Doremus, chief engr.
Heavy refrigerating and ice-making machinery.

Detroit Metal Specialty Corp.,
1651 Beard Ave., Detroit, Mich.
T. J. Keefe, sales representative.
Liquid receivers, boiler shells, stamped fans and fly wheels.

Detroit Nut Co., Inc.,
2456 Hubbard Ave., Detroit, Mich.
A. H. Schenk, sales mgr.
Steel, brass and bronze nuts.

Detroit Screw Works,
1477 E. Atwater St., Detroit, Mich.
J. G. Wagner, secy. and sales mgr.
Brass and steel cap screws, nuts and studs. Brass pipe connections. Brass and steel special screw machine parts.

Detroit Stamping Co.,
3445 W. Fort St., Detroit, Mich.
Fred Haskel, pres.
Trade name ..... De-Sta-Co
Diaphragms for expansion valves and spacers and special stampings.

De Vilbiss Co.,
224 Phillips Ave., Cleveland, Ohio.
Paint and lacquer sprays.

Devon Manufacturing Co.,
2 Brooks St., Brighton, Mass.
Trade name.....Devon
Complete domestic refrigeration systems.
High Side
Standard sizes—1. Drive—Belt.
Compressor—Reciprocating. Motor—¼ hp.
Control—Temperature. Method of cooling—Air.
Refrigerant—Air.
Capacity (ice melting)—100 lbs.
Low Side
Capacities—5 to 12 cu. ft.
Freezing trays—2 to 8. Ice cubes—42 to 200.

Dillingham Mfg. Co., Sheboygan, Wis.
Trade name .....Iceberg
Domestic refrigeration cabinets, sizes.....8
Food capacities.....5 to 9 cu. ft.
Construction ..... Wood
Insulation ..... Cork
Hardware ..... Dent
Gaskets ..... Jarrow
Finish (interior).....Porcelain or enamel

Dole Refrigerating Machine Co.,
1209 Washington Blvd., Chicago, Ill.
A. R. Dole, pres.; H. W. Kleist, vice-pres. and chief engr.; J. D. Hollowell, gen. mgr. and secy.; F. W. Tweed, treas.; J. D. Hollowell, Jr., pur. agt.
Trade name..... DoleCo.
Complete refrigeration systems.
High Side
Standard sizes—8. Drive—V-belt.
Compressor—Reciprocating. Seal—Packing.
Motor—¼ to 3 hp. Make—Century.
Control—Temperature. Make—Time-O-Stat.
Water valve—Pressure. Make—Penn.
Condenser—Combination tube and receiver.
Method of cooling—Water.
Refrigerant—Ammonia.
Capacities (ice melting)—250 to 3500 lbs.
Low Side
Dry system. Method of cooling—Direct.
Expansion valve—Diaphragm. Make—Alco.

Domestic Electric Co., Kent, Ohio.
E. S. Sabin, Jr., sales mgr.
Trade name..... Domestic
Fractional horsepower motors.

Domestic Utilities,
Garrison Blvd. at Western Md. R. R., Baltimore, Md.
C. E. Loman, pres.
Trade name.....Coldbloc,, Reco
Electric dairy coolers, fittings and special tanks.
(See Advertisement on Page 48)

Dow Chemical Co., Midland, Mich.
Donald Williams, asst. sales mgr.
Calcium chloride and ethyl chloride.

Downing Mfg. Co., Downing, Wis.
D. C. Collidge, pres.; E. C. Wagner, vice-pres.; R. A. Cleveland, secy. and treas.
Trade name.....Downing
Commercial wall and walk-in coolers and display cases.

Drayer & Hanson, Inc.,
738 E. Pico St., Los Angeles, Calif.
H. E. Drayer, pres.; Bert Hanson, vice-pres. and gen. mgr.; P. E. McKenna, secy.; R. E. Ristow, sales mgr.; F. A. Schmidt, chief engr.
Trade name.....D & H
Commercial refrigeration cabinets.

Dry Ice Corp. of America.
52 Vanderbilt Ave., New York, N. Y.
George C. Cusack, gen. sales mgr.
Trade name ..... Dry-Ice
Solid carbon dioxide.

Dry-Kold Refrigerator Co., Niles, Mich.
W. F. Harrah, pres.; Jos. P. Troost, vice-pres.; W. C. Whitcher, gen. mgr. and secy.
Trade name.....Dry-Kold
Commercial grocers' refrigerators, market coolers and display cases.

Dry-Zero Corp., 130 N. Wells St., Chicago, Ill.
Gale T. Pearce, engr. in charge of sales.
Trade name.....Dry-Zero
Pliable slab and blanket insulation.
(See Advertisement on Page 37)

Du Pont De Nemours & Co., E. I.,
Chemical Products Division, Parlin, N. J.
Trade name ..... Duco
Chemicals, paint, varnish and finishing materials.
Rubber Products Division, Fairfield, Conn.
Trade name ..... Du Pont
Gasket material.

Durable Products Co.,
5005 Euclid Ave., Cleveland, Ohio.
Trade name ..... Paracote
Liquid gum coating for preserving all metal surfaces.

Dura Co., Toledo, Ohio.
Designers and manufacturers of decorative fittings and metal trim.

Duriron Co., Inc., Dayton, Ohio.
Valves for acid service.

Dwelley, Inc., G. M.,
Curtis Bldg., Detroit, Mich.
H. C. Clappison, vice-pres.
Trade name ..... Flexotray
Rubber ice cube trays.

Dyer Electric Cooler Corp.,
Bryant Park Bldg., New York, N. Y.
Water coolers.

E

Eberhard Mfg. Co.,
2800 Tennyson Rd., Cleveland, Ohio.
Clamps and tools.

Ebinger Sanitary Mfg. Co., D. A.,
401 W. Town St., Columbus, Ohio.
Trade name.....Ebco
Water coolers.

Eddy & Sons, 339 Adams, Boston, Mass.
Trade name.....Eddy
Domestic refrigeration cabinets.

Egyptian Lacquer Mfg. Co., Inc.,
90 West St., New York, N. Y.
Louis A. Ruckgaber, asst. vice-pres.
Trade name ..... Egyptian
Lacquers, primers, fillers, glazes, undercoatings, enamels and thinners.

Ehrlich & Sons Mfg. Co., H., St. Joseph, Mo.
Trade name.....Ehrlich
Commercial refrigeration cabinets.

Electrical Testing Laboratories,
80th & East End Ave., New York, N. Y.
Test reports and data on overall performance or on electrical, mechanical, or chemical equipment.
(See Advertisement on Page 8)

Electro-Kold Corp.,
151 S. Post St., Spokane, Wash.
Trade name.....Electro-Kold
Complete refrigeration systems.
High Side
Standard sizes—6. Drive—V-belt.
Compressor—Reciprocating. Seal—Diaphragm.
Motor—1/6 to 1½ hp. Make—Century, Wagner, Emerson, G. E.
Control—Pressure.
Method of cooling—Air and water.
Water valve—Pressure. Make—Protectostat.
Refrigerant—Sulphur dioxide.
Capacities—50 to 2000 lbs.
Low Side
Standard sizes—71. Dry system.
Method of cooling—Direct. Float valve—Low side.
Expansion valve—Diaphragm.
Capacities—5 to 7000 cu. ft.
Freezing trays—2 to 18. Ice cubes—24 to 380.

Electrolux Refrigerator Sales, Inc.
Evansville, Ind.
Trade name ..... Electrolux
Ammonia absorption system operated by gas or electric heat.
High Side
Standard sizes—9. Seal—Hermetic.
Control—Temperature.
Method of cooling—Water.
Condenser—Steel tube.
Refrigerant—Ammonia.
Capacities (ice melting)—50 to 100 lbs.
Low Side
Standard sizes—9. Flooded system.
Method of cooling—Direct.
Capacities—4 to 10 cu. ft.
Freezing trays—4 to 7. Ice cubes—36 to 70.
(See Advertisement on Page 15)

Elkins Refrigerator & Fixture Co.,
A. Malling, pres. and gen. mgr.; S. J. Schwenger, vice-pres.; B. Faulb, secy.
5201 Denison Ave., Cleveland, Ohio.
Trade name.....Elkins
Commercial wall and walk-in coolers, display cases and florist refrigerators.

Emerson-Brantingham Corp., Rockford, Ill.
Porcelain enamel ware.

Emerson Electric Mfg. Co.,
2018 Washington Ave., St. Louis, Mo.
Trade name ..... Emerson
Motors.

Erie Art Metal Co., Erie, Pa.
W. H. Knobloch, pres. and gen. mgr.; A. F. Schabacker, vice-pres. and adv. mgr.; Emil Bauchard, secy. and prod. mgr.; A. Alloway, chief engr.
Trade name.....Dan-Dee
Domestic refrigeration cabinets.

Erie Forge Co., Erie, Pa.
Die blocks.

Esco Cabinet Co.,
140 E. Market St., Westchester, Pa.
Trade name.....Esco
Milk coolers.

Eureka Pneumatic Spray Co.,
Richmond Hill, L. I., New York.
Paint spraying apparatus.

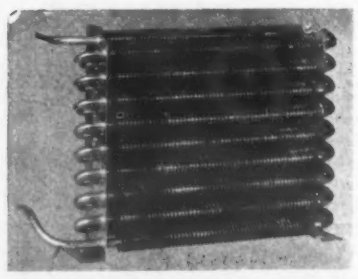
Eureka Refrigerator Co., Ltd.,
Owen Sound, Ont., Canada.
J. E. Keenan, pres.; John C. Keenan, vice-pres.; Thos. B. Christie, gen. mgr.; R. F. Keenan, sales mgr. and prod. mgr.; S. C. Tench, chief engr.
Commercial wall and walk-in coolers and display cases.

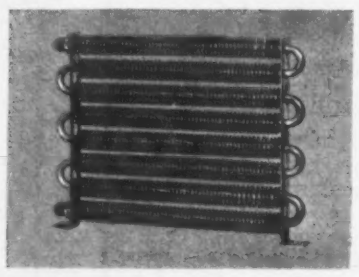
Excelsior Motor Mfg. & Supply Co.,
3701 Cortland St., Chicago, Ill.
Ignaz Schwinn, pres. and treas.; Frank W. Schwinn, vice-pres. and gen. mgr.; Jos. M. Grossmith, secy.; M. W. Crawford, sales mgr.; Wesley G. Paulson, adv. mgr.; A. P. Anderson, chief engr.; J. E. Anderson, pur. agt.
Trade name.....Excelsior
Complete refrigeration systems.
High Side
Standard sizes—4. Drive—V-belt.
Compressor—Reciprocating. Seal—Cooke Seal Ring.
Motor—½ to 2 hp. Make—Century.
Control—Temperature. Make—American Radiator.
Method of cooling—Water. Condenser—Plain tube.
Water valve—Pressure. Make—Peerless.
Refrigerant—Ammonia.
Capacities (ice melting)—500 to 2000 lbs.
Low Side
Dry system. Method of cooling—Direct.
Expansion valve—Diaphragm. Make—Alco.

F

Fabien Refrigerator Co., Ltd., C. P.,
2471-85 Ste. Cunegonde St., Montreal, Canada.
C. A. Fabien, pres. and gen. mgr.; Henry Fabien, vice-pres.; J. A. Fabien, secy. and treas.; J. A. D. Fabien, sales mgr.; H. Gonthier, adv. mgr.; D. Fabien, chief engr.; A. Bouvier, prod. mgr.
Trade name.....Fabien
Domestic refrigeration cabinets, sizes.....6
Food capacities.....6 to 20 cu. ft.
Construction .....Metal and Wood
Insulation.....Balsam Wool, Corkboard, Celotex
Hardware.....
Winters & Crampton, Arcade, Hahn Brass
Gaskets ..... Ladore
Finish (exterior).....Lacquer
Finish (interior).....Porcelain, enamel
Commercial walk-in coolers.

Fafnir Bearing Co., The, New Britain, Conn.
E. R. Carter, Jr., vice-pres.
Ball bearings.





Fairfield Mfg. Co., Fidelity Bldg., Portland, Me.
Trade name.....Evercold
Domestic and commercial refrigeration cabinets.

Faultless Caster Co.,
Garvin St., Evansville, Ind.
Casters.

Fedders Mfg. Co.,
57 Tonawanda St., Buffalo, N. Y.
William D. Keefe, sales mgr., refrigeration div.
Cooling units, condensers, low side floats, dry evaporators, expansion valves, freezing units, liquid receivers, filters, strainers, suction screens, dehydrators.

Federal Asbestos & Cork Insulation Co.,
44th and State Sts., Milwaukee, Wis.
Trade name.....Federal
Domestic and commercial refrigeration cabinets.
Cork insulation.

Federal Machine & Welder Co.,
Dana Ave., Warren, Ohio.
Spot, butt and seam, projection, flash and special welding machines.

Ferracute Machine Co., Bridgeport, Conn.
Punch presses, shears.

Ferro Enamel Supply Co.,
2100 Keith Bldg., Cleveland, Ohio.
Porcelain enamels and porcelain enameling furnaces, box type and continuous type.
(See Advertisement on Page 47)

Fessler Mfg. Co.,
19th & Central, Kansas City, Mo.
Complete refrigeration systems.
Trade name.....Femcold
High Side
Compressor—Reciprocating. Drive—Belt.
Motor—¼ hp. Control—Pressure.
Method of cooling—Air. Condenser—Fin tube.
Refrigerant—Methyl chloride.
Capacity (ice melting per hour)—10½ lbs.
Low Side
Method of cooling—Direct.
Freezing trays—2 to 4. Ice cubes—56 to 112.

Filtrine Mfg. Co.,
49 Lexington Ave., New York, N. Y.
Trade name ..... Filtrine
Filters for water coolers and condensers. Coolers for electric refrigerating machines.
(See Advertisement on Page 46)

Flint Foundry Co., Division of General Foundry & Machine Co., Flint, Mich.
Gray and malleable iron castings.

Flintlock Corp.,
4461 W. Jefferson Ave., Detroit, Mich.
Trade name ..... Flintlock
Condensers.
(See Advertisement on Page 20)

Ford Refrigerator Co., Inc.,
219 Mary St., South Jacksonville, Fla.
M. C. Ford, pres.; John L. Varner, vice-pres. and gen. mgr.; L. F. Ford, secy. and treas.; D. Richeson, sales mgr.; Fred L. Ford, prod. mgr.
Trade name.....Ford
Domestic and commercial refrigeration cabinets built to customer's specification.
(See Advertisement on Page 18)

Foster Merriam Co.,
119 Colony St., Meriden, Conn.
C. C. Rossire, Jr., sales mgr.; J. B. Coggins, factory mgr.
Locks and hinges.

Foster Wheeler Corp.,
165 Broadway, New York, N. Y.
Frank J. Swenson, sales mgr. brass div.
Copper and brass tubing and pipe.

Foxboro Co., Foxboro, Mass.
C. E. Sullivan, gen. sales mgr.
Indicating, recording and controlling instruments.

France Packing Co., Tacony, Philadelphia, Pa.
Metallic packing.

Frantz Refrigeration Co.,
404 N. Front St., Reading, Pa.
Water coolers.

Frankenberg Refrigeration Co.,
21 Florida Ave., Belleville, Ill.
Trade name.....Frankenberg
High Side
Standard sizes—8. Drive—Belt.
Compressor—Reciprocating. Seal—Cooke.
Motor—1/6 to 7½ hp. Make—Wagner, Fairbanks-Morse.
Control—Temperature. Make—Ranco, Mercoid.
Method of cooling—Air and water.
Condenser—Fin coil. Water valve—Pressure.
Refrigerant—Sulphur dioxide and ammonia.
Capacities (ice melting)—50 lbs. to 5 tons.
Low Side
Dry or flooded system.
Method of cooling—Direct. Float valve—High side.
Expansion valve—Diaphragm.

French Mfg. Co.,
128 Robbins, Waterbury, Conn.
Seamless copper tubing.

Fresno Show Case & Fixture Co.,
1805 Anna, Fresno, Calif.
Commercial wall and walk-in cooler and display cases.

Fretz Brass & Copper Co.,
523 Arch St., Philadelphia, Pa.
Harry Klingler, vice-pres.
Copper tubing and fittings.
(See Advertisement on Page 34)

Frick Co., Waynesboro, Pa.
Ezra Frick, pres.; J. G. Benedict, vice-pres.; D. N. Benedict, gen. mgr.; A. H. Baer, sales mgr.; N. M. Small, chief engr.
Commercial refrigeration systems.
Trade name.....Frick
High Side
Compressor—Reciprocating.
Motor—1 hp. and up.
Refrigerant—Ammonia and carbon dioxide.
Capacities (ice melting)—½ ton up. For display cases up to 90 cu. ft. total, or refrigerators of 700 cu. ft. up.
(See Advertisement on Page 8)

Friedrich, Ed.
1117 E. Commerce St., San Antonio, Tex.
Trade name.....Ed. Friedrich
Commercial wall and walk-in coolers, display cases, florist and institutional refrigerators.

Frigidaire Corp., Dayton, Ohio.
Trade name.....Frigidaire
Complete electric refrigeration systems, domestic and commercial, including water coolers, milk coolers and ice cream cabinets.
High Side
Standard sizes—9. Drive—V-Belt.
Compressor—Reciprocating. Seal—Metallic.
Motor—1/6 to 1½ hp. Control—Pressure.
Method of cooling—Air and water.
Water valve—Pressure.
Condenser—Plain tube and radiator type.
Refrigerant—Sulphur dioxide.
Capacities (ice melting based on 50% compressor running time)—40 to 500 lbs.
Low Side
Standard sizes—44. Dry or flooded system.
Method of cooling—Direct and indirect.
Expansion valve—Diaphragm. Float valve—Low side.
Freezing trays—2 to 7. Ice cubes—24 to 168.
Domestic refrigeration cabinets, sizes.....25
Food capacities.....3.7 to 18 cu. ft.
Insulation ..... Cork
Finish (exterior).....Porcelain, lacquer
Finish (interior).....Porcelain, enamel
Commercial refrigeration cabinets.
(See Advertisement on Page 11)

Frigid Zone Mfg. Co., Inc.,
2809 Third Ave., Seattle, Wash.
Trade name.....Frigid Zone
Complete refrigeration systems.
High Side
Standard sizes—5. Drive—Belt.
Compressor—Reciprocating. Seal—Sylphon.
Motor—1/6 to 1½ hp. Make—Wagner, Century.
Control—Pressure and temperature.
Method of cooling—Air and water.
Water valve—Pressure. Condenser—Coil.
Refrigerant—Sulphur dioxide.
Capacities—25 to 1000 lbs.
Low Side
Standard sizes—8.
Method of cooling—Direct or indirect.

Frig-o-matic, Ltd.,
Morrell St., Brantford, Ont., Canada.
A. E. Spowage, pres. and gen. mgr.; R. Forsyth, vice-pres.; Miss V. Flath, secy. and treas.; R. R. Richardson, sales mgr.; F. W. Pogue, adv. mgr.; J. Palmer, chief engr.; H. Donnell, prod. mgr. and pur. agt.
Trade name.....Frig-o-matic
Complete refrigeration systems.
High Side
Standard sizes—4. Drive—Belt.
Compressor—Reciprocating. Seal—Cooke Seal Ring.
Motor—1/6 to ½ hp. Make Century, Wagner.
Temperature—Pressure and temperature. Make—Mercoid, Ranco.
Method of cooling—Air. Condenser—Radiator type.
Refrigerant—Sulphur dioxide.
Capacities—160 to 430 lbs.
Low Side
Standard sizes—4. Flooded system.
Method of cooling—Direct. Float valve—Low side.
Capacities—8 to 20 cu. ft.
Freezing trays—1 to 4. Ice cubes—28 to 112.

Fulton Bag & Cotton Mills,
Georgia R. R. & South Blvd., Atlanta, Ga.
Trade name.....Fulco
Refrigerator covers.

Fry Glass Co., H. C., Rochester, Pa.
C. K. Fry, vice-pres.
Glass refrigerator dishes.

Fulton Bag & Cotton Mills, Atlanta, Ga.
Trade name.....Fulco
Refrigerator covers.
(See Advertisement on Page 18)

Fulton Sylphon Co., Knoxville, Tenn.
Trade name ..... Sylphon
Metal bellows and temperature controls.

G

Gale Mfg. Co., Albion, Mich.
Castings.

Gaus Mfg. Co.,
Main & Clinton Sts., St. Louis, Mo.
Commercial refrigeration cabinets.

Gardner Machine Co., Beloit, Wis.
Trade name.....Gardner
Flat surface grinders, discs, ring wheel and automatic grinders, abrasive discs, polishing and buffing machines.

Gardener Tap & Die Co., Marion, Ohio.
Taps, dies.

Garland Refrigerator Co., Inc.,
101 Park Ave., New York, N. Y.
Trade name.....Garland
Commercial custom built refrigeration cabinets.

Gates Rubber Co.,
999 S. Broadway, Denver, Colo.
Belts, hose and moulded rubber products.

General Bearing Co.,
81 W. 60th St., New York, N. Y.
Ball bearings.

General Electric Co., Electric Refrigeration Dept. Hanna Bldg., Cleveland, Ohio.
T. K. Quinn, gen. mgr.; P. B. Zimmerman, gen. sales mgr.; L. R. Edwards, adv. mgr.; W. M. Timmerman, comm. engr.
Trade name.....General Electric
Complete electric refrigeration systems, domestic and commercial, including water and milk coolers.
High Side
Standard sizes—5. Drive—Direct.
Compressor—Reciprocating. Motor—1/10 hp.
Method of cooling—Air. Condenser—Plain tube.
Control—Temperature.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—50 to 350 lbs.
Low Side
Standard sizes—7. Flooded system.
Method of cooling—Direct or indirect.
Float valve—High side.
Capacities—4 to 70 cu. ft.
Freezing trays—2 to 4. Ice cubes—48 to 112.
Domestic refrigeration cabinets, sizes.....11
Food capacities.....4 to 17 cu. ft.
Construction ..... Steel
Finish (exterior).....Sanak
Finish (interior) ..... Porcelain
Commercial refrigeration cabinets.
(See Advertisement on Page 3)

General Electric Co., Schenectady, N. Y.
Fractional horsepower motors and wiring devices.

General Etching & Mfg. Co.,
3070 W. Grand Ave., Chicago, Ill.
Name plates, dials and stampings.

General Refrigeration Co., Beloit, Wis.,
T. E. Swords, pres.; Jas. R. Morash, vice-pres. and gen. mgr.; J. J. Tyndal, secy.; Geo. O. Forbes, treas.; W. C. Moore, adv. mgr.; F. E. Dennison, chief engr.; J. E. Churm, pur. agt.
Trade name.....Lipman
Complete refrigeration systems.
High Side
Standard sizes—14. Drive—Belt.
Compressor—Reciprocating. Seal—Oil.
Motor—½ to 40 hp. Make—G. E., Wagner.
Control—Temperature. Make—Time-O-Stat.
Method of cooling—Water.
Water valve—Pressure and governor. Make—Refrigerating Specialties Co.
Condenser—Shell and tube and shell and coil.
Refrigerant—Ammonia.
Capacities—400 lbs. to 20 tons.
Low Side
Dry system. Expansion valve—Diaphragm.
Method of cooling—Direct or indirect.

General Refrigerating & Mfg. Corp.,
411 Kraemer Bldg., Portland, Ore.
Trade name.....King Boreas
Complete refrigeration systems.

General Steel Wares, Ltd.,
199 River St., Toronto, Ont., Canada.
Trade name.....SMP
Domestic refrigeration cabinets.

General Utilities Co.,
199 Exchange St., Bangor, Maine.
Trade name.....General Utilities
Complete refrigeration systems.
High Side
Standard sizes—4. Drive—Belt.
Compressor—Reciprocating. Seal—Bellows.
Motor—1/6 to ½ hp. Make—Century, Wagner.
Method of cooling—Air. Condenser—Radiator type.
Refrigerant—Methyl chloride.
Control—Temperature.
Capacities—125 to 260 lbs.
(See top of next column)
Low Side
Standard sizes—3. Dry system.
Method of cooling—Direct.
Expansion valve—Diaphragm.
Capacities—4 to 30 cu. ft.
Freezing trays—1 to 4. Ice cubes—24 to 96.

Geometric Tool Co.,
Blake & Valley Sts., New Haven, Conn.
Trade name.....Geometric
Taps, die heads, threading machines, grinders and grinding fixture.

Geuder, Paeschke & Frey Co.,
St. Paul Ave. & 15th St., Milwaukee, Wis.
C. H. Voss, sales representative.
Trade name..... Cream City Ware
Drip, defrosting and freezing pans. Stampings and pressed parts from 14 to 30 gauge copper, steel, zinc, aluminum, brass, Monel and stainless steel, either plain, hot lead-coated, galvanizzed, tinned, japanned or vitreous enameled. Round refrigerator dishes.

Gibson Refrigerator Co., Greenville, Mich.
Trade name..... Gibson
Domestic refrigeration cabinets, sizes.....36
Food capacities.....4 to 9 cu. ft.
Construction ..... Steel
Hardware.....Grand Rapids Brass
Gaskets .....Wirfs
Finish (exterior).....Porcelain, lacquer
Finish (interior).....Porcelain, enamel
Commercial wall and walk-in coolers and display cases.
(See Advertisement on Page 16)

Giddings & Lewis Machine Tool Co.,
Fond du Lac, Wis.
Horizontal boring machines.

Gilmer Co., L. H.,
Keystone & Cottman Sts., Philadelphia, Pa.
Rubber V and flat type belts.

Gisholt Machine Co., Madison, Wis.
W. J. Hannum, sales mgr.
Turret lathes, automatic latches, balancers, tool grinders.

Gloekler Co., Bernard,
1627 Penn Ave., Pittsburgh, Pa.
Trade name..... Gloekler
Domestic refrigeration cabinets, sizes.....6
Food capacities.....5 to 15 cu. ft.
Construction ..... Metal
Insulation .....Sheet cork
Finish (exterior).....Porcelain
Finish (interior).....Lacquer
Commercial wall coolers and display cases.

Globe Rubber & Tire Co., Inc.,
Prospect & Globe Sts., Trenton, N. J.
Trade name.....Red Strand
V-belts and rubber bushings.

Goodell-Pratt Co., Greenfield, Mass.
C. L. Beecher, sales mgr.
Electric drills.

Goodnow & Blake Mfg. Co.,
3840 Beaver St., Detroit, Mich.
Thermostats, suction controls, high pressure cut-outs, and floats.

Goodrich Rubber Co., B. F.,
South Main St., Akron, Ohio.
V-belts, sponge rubber, rubber tubing, lathe cut washers and moulded rubber parts.

Grand Rapids Blow Pipe Co.,
Grand Rapids, Mich.
Enameling ovens, spray booths.

Grand Rapids Brass Co.,
66 Scribner Ave., N. W., Grand Rapids, Mich.
Refrigerator hardware.
(See Advertisement on Page 29)

Greenfield Tap & Die Corp., Greenfield, Mass.
Taps, dies, screw plates, reamers, gages, drills, pipe tools and grinders.

Gruendler Refrigerator Division,
Allied Store Utilities Co.
814 N. Broadway, St. Louis, Mo.
Commercial wall and walk-in coolers and display cases.

Gurney Ball Bearing Division, Marlin-Rockwell Corp., Jamestown, N. Y.
H. A. Johnson, sales mgr.
Ball bearings

Gurney Refrigerator Co., Fond du Lac, Wis.
E. G. Vail, pres. and treas.; A. D. Thonner, vice-pres.; F. A. Foster, secy.; S. L. Little, adv. mgr.; Nick Willing, chief engr.; R. F. Mitchell, prod. mgr. and pur. agt.
Trade name.....Athermos, Royal Gurney
Domestic refrigeration cabinets, sizes.....13
Food capacities .....5.7 to 60 cu. ft.
Construction.....Wood and metal
Insulation ..... Corkboard
Finish (exterior).....Wood and porcelain
Finish (interior).....Enamel and porcelain

H

Haberkorn & Wood,
2208 W. Fort St., Detroit, Mich.
Machine tools, air chucks, fixtures.

Hale & Kilburn Co.,
1900 Lehigh Ave., Philadelphia, Pa.
Stampings. Also make ice cream cabinets and water coolers.

Hamilton & Sons, W. A. W.
Racine & Montrose Aves., Chicago, Ill.
Ice cream and beverage cabinets, milk coolers, conversion equipment for salt and brine soda fountains and ice cream cabinets.

Handy & Harmon
57 William St., New York, N. Y.
G. N. Niemeyer, vice-pres.; J. C. Travis, asst. to vice-pres.
Silver solder, wire and sheet.
(See Advertisement on Page 14)

Frank Hanson Machine Co.,
25 E. Atwater St., Detroit, Mich.
Tools, dies and experimental machine work.

Hanson & Van Winkle Co.,
Chestnut & Van Buren Sts., Newark, N. J.
Plating and polishing equipment, platers of anodes.

Hanson-Whitney Machine Co.,
Hartford, Conn.
Machinery, taps, hobs and thread gages.

Harder Refrigeration Corp., Cobleskill, N. Y.
E. S. Ryder, pres.; F. H. Ryder, vice-pres. and gen. mgr.; G. D. Ryder, secy. and treas.; H. L. Merrill, sales mgr.; A. W. Rowley, chief engr. and prod. mgr.; E. C. Allen, pur. agt.
Trade name.....Kleen Kold, Hudson
Domestic refrigeration cabinets, sizes.....6
Food capacities.....4 to 6 cu. ft.
Insulation ..... Corkboard
Hardware.....Grand Rapids Brass
Gaskets ..... Wirfs
Finish (exterior).....Porcelain
Finish (interior).....Porcelain

Harry Bros. Mfg. Co.,
1302 E. Woodbridge St., Detroit, Mich.
W. G. Harry, pres.
Metal stampings.

Harshaw Chemical Co.,
Hanna Bldg., Cleveland, Ohio.
Chemicals used in preparing finishes.

Hart & Burmeister,
Jerrold at Napoleon, San Francisco, Calif.
Trade name.....California
Domestic refrigeration cabinets.

Hartford Engineering & Machine Co.,
Aberdeen, Md.
Trade name.....Everkold
Complete refrigeration systems.
High Side
Compressor—Reciprocating. Drive—Belt.
Motor—⅛ and 1/6 hp. Seal—Bellows.
Method of cooling—Air. Condenser—Fin coil.
Control—Temperature and pressure.
Refrigerant—Sulphur dioxide.
Low Side
Standard sizes—1. Flooded system.
Float valve—Low side. Capacity—5 cu. ft.

Haven Manufacturing Co.,
486 Milwaukee Ave., Milwaukee, Wis.
Charles D. Haven, pres.; A. M. Krech, vice pres.; Ernest F. Vilter, secy. and treas.
Complete refrigeration systems, brine tanks, finned tube evaporating units and milk cooling units.
Trade name.....Haven
High Side
Standard sizes—4. Compressor—Oscillating.
Drive—Gear and belt. Sale—Bellows.
Motor—1/3 to ¾ hp. Make—Century.
Control—Temperature.
Method of cooling—Air. Condenser—Radiator.
Refrigerant—Methyl Chloride.
Capacities (ice melting)—170 to 600 lbs.
Low Side
Standard sizes—15. Dry system.
Method of cooling—Direct or indirect.
Expansion valve—Rotary.
Capacities—6 to 25 cu. ft.
Freezing trays—3 to 30. Ice cubes—10 to 300.

Hayes Box,
7-12 Morgan Plan Bank Bldg., Meridian, Miss.
Bottled beverage coolers.

Heintz Mfg. Co.,
Font & Olney Aves., Philadelphia, Pa.
Domestic refrigeration cabinets.
Trade name.....Steel Prest
Construction ..... Steel
Insulation.....Cork and Celotex
Finish (exterior).....Lacquer
Finish (interior).....Enamel

Heinz & Munschauer,
20 Superior St., Buffalo, N. Y.
E. A. Munschauer, pres.; F. E. Heinz, vice-pres.; F. E. Munschauer, secy.; G. R. Munschauer, treas.; J. J. Keefe, adv. mgr.; P. L. Hanson, chief engr.; M. G. J. Nauth, pur. agt.
Domestic refrigeration cabinets, sizes.....10
Trade name.....Niagara
Food capacities.....4.75 to 8 cu. ft.
Construction.....Steel and wood
Insulation ..... Cork
Hardware.....Grand Rapids Brass
Gaskets ..... Freydberg
Finish (exterior).....Lacquer
Finish (interior).....Enamel

Hendey Machine Co., Torrington, Conn.
Engine lathes, crank shapers, centering machines.

Henry Valve Co.,
3260 West Grand Ave., Chicago, Ill.
Guy J. Henry, sales mgr.
Forged brass valves, packless valves, strainers, relief valves, check valves, elbows, tees, crosses, flanges, unions, reducers, plugs, couplings and flared tube nuts.

Henry & Wright Machine Co., Hartford, Conn.
Drill presses.

Herrel & Sons Co., John,
244 Gear St., Columbus, Ohio.
Otto J. Herrel, pres.; Harry F. Herrel, vice-pres.; Albert W. Herrel, gen. mgr.; Frank Herrel, secy.
Trade name.....Herrel
Domestic refrigeration cabinets, sizes.....5
Food capacities.....5 to 20 cu. ft.
Construction.....Steel and wood
Insulation ..... Corkboard
Hardware.....Arcade and Garey
Gaskets ..... Dennis
Commercial wall and walk-in coolers and display cases.

Herrick Refrigerator & Cold Storage Co.,
Waterloo, Iowa.
Nathan Northey, pres.; Edward N. Northey, vice-pres.; Harry G. Northey, gen. mgr. and secy.; W. E. Ogle, treas.; C. A. LaBarre, chief engr.; C. N. Ogle, prod. mgr.
Trade name.....Herrick
Domestic refrigeration cabinets, sizes.....87
Food capacities .....7.5 to 65.31 cu. ft.
Construction ..... Wood
Insulation ..... Mineral Wool
Hardware ..... Dent
Gaskets .....Wirfs, Bosley
Finish (exterior) ..... Oak
Finish (interior)..Opal glass, porcelain, enamel
Commercial wall coolers and display cases.

Hill & Co., Inc., C. V.,
360 Pennington Ave., Trenton, N. J.
C. V. Hill, Sr., pres.; Alfred E. Titus, vice-pres.; J. Stuart Hill, gen. mgr.; J. T. Knotts, secy. and treas.; C. V. Hill, Jr., sales and adv. mgr.; A. M. Hill, chief engr.; Fred Stollsteimer, prod. mgr.; A. T. Holloway, pur. agt.
Trade name.....Hill Dry-Cold
Commercial display cases.

Hoff & Forney
7023 E. Kirby, Detroit, Mich.
Shut-off valve stems, centerless grinding and screw machine parts.

Holbrook Mfg. Co., Inc.,
903 N. Main St., Los Angeles, Calif.
Trade name.....Holbrook
Complete refrigeration systems.
High Side
Standard sizes—8. Drive—Belt.
Compressor—Reciprocating. Seal—Sylphon.
Motor—1/6 to 2 hp. Make—Wagner, Century.
Control—Temperature. Make—American Radiator.
Method of cooling—Air and water.
Water valve—Pressure. Make—Penn.
Condenser—Fin coil, radiator type.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—60 to 2000 lbs.
Low Side
Standard sizes—32. Dry or flooded system.
Method of cooling—Direct or indirect.
Expansion valve—Bellows. Make—American.
Float valve—Low side.
Capacities—4 to 12 cu. ft.
Freezing trays—2 to 12. Ice cubes—30 to 251.

Holcomb & Hoke Mfg. Co.,
1545 Van Buren Ave., Indianapolis, Ind.
J. I. Holcomb, pres. and gen. mgr.; Fred Hoke, vice-pres. and treas.; Frank Hoke, asst. secy. and chief engr.; E. R. Wurgler, sales mgr.; P. N. Cook, adv. mgr.; Geo. Rossebo, prod. mgr., F. J. Holzhaver, pur. agt.
Trade name.....H & H
Commercial display cases.

Holcomb Steel Co., Syracuse, N. Y.
Die blocks.

Holderle Bros., Inc.,
339 Exchange, Rochester, N. Y.
Fred W. Holderle, Jr., pres. and gen. mgr.; Fred Holderle, Sr., vice-pres.; C. L. Holderle, secy. and treas.
Trade name.....Honer Bilt
Commercial refrigeration cabinets, and electric soda fountains.

Holmes Products, Inc., Bridgeport, Conn.
Complete refrigeration systems.
Trade name.....Holmes
Domestic refrigeration cabinets, sizes.....4
Finish (exterior).....Lacquer

Houghton & Co., E. F.
240 W. Somerset St., Philadelphia, Pa.
Compressor oils.

Houston Icylectric Co.,
Main & Franklin Sts., Houston, Tex.
Trade name.....Icylectric
Complete refrigeration systems.
High Side
Standard sizes—12. Drive—Belt.
Compressor—Reciprocating.
Seal—Revolving and sylphon.
Motor 1/6 to 2½ hp. Make—G. E. and Wagner.
Control—Pressure and temperature.
Method of cooling—Air and water.
Water valve—Electric. Make—Hartzook.
Condenser—Finned tube, coiled.
Refrigerant—Methyle chloride and sulphur dioxide (ice melting).
Capacities—70 to 2290 lbs.
Low Side
Dry or flooded system. Float valve—Low side.
Method of cooling—Direct or indirect.
Capacities—12 to 148 cu. ft.
Freezing traps—2 to 36. Ice cubes—24 to 864.

Howe Ice Machine Co.,
2825 Montrose Ave., Chicago,, Ill.
Trade name.....Howe
Complete refrigeration systems.
High Side
Standard sizes—14. Drive—V-belt.
Compressor — Reciprocating. Seal — Metallic Packing.
Motor—1 to 200 hp. Condenser—Plain tube.
Control—Pressure and temperature.
Method of cooling—Water.
Water valve—Pressure.
Refrigerant—Ammonia and methyl chloride.
Capacities (ice melting)—¾ to 142 tons.
Low Side
Dry or flooded system.
Method of cooling—Direct or indirect.
Expansion valve—Diaphragm. Make—Alco.
High Side

Howe Scale Co., Rutland, Vt.
F. G. Riehl, pres.; A. N. Lyons, treas.; E. V. Syrcher, sales promotion mgr.
Trade name..... Howe
Commercial wall and walk-in coolers and display cases.

Hussmann Refrigerator Division,
Allied Store Utilities Co.
911 N. Broadway, St. Louis, Mo.
Commercial wall and walk-in coolers and display cases.
(See Advertisement on Page 33)

Hutto Engineering Co., Inc.,
515 Lycaste, Detroit, Mich.
J. G. Young, sales engr. and mgr.
Cylinder grinding machines.

I

Iceberg Mfg. Co., Gardner, Mass.
J. H. Drury, pres.; James A. Pearson, vice-pres. and gen. mgr.; Carl H. Hestrom, secy.; Walter Beaman, treas.; Cabel Sundeen, chief engr.; L. Vezzani, pur. agt.
Trade name.....Ice-Berg
Complete refrigeration systems.
High Side
Standard sizes—2. Drive—Belt.
Compressor—Reciprocating. Seal—Bellows.
Motor—1/6 to ¼ hp. Make—G. E., Wagner and Century.
Control—Temperature. Make—Ranco.
Method of cooling—Air. Condenser—Fin coil.
Refrigerant—Methyl chloride.
Capacities (ice melting)—100 to 200 lbs.
Low Side
Standard sizes—10. Method of cooling—Indirect.
Expansion valve—Bellows. Make—American Radiator.
Capacities—4 to 16 cu. ft.
Freezing trays—2 to 7. Ice cubes—24 to 168.

IcElect Corp., 1102 Harney St., Omaha, Nebr.
A. E. Schneider, pres. and sales mgr.; A. G. Magnusen, vice-pres.; F. J. Schneider, secy. and treas.
Trade name.....IcElect
Complete refrigeration systems.
High Side
Standard sizes—6. Drive—Belt.
Compressor—Reciprocating. Seal—Oil thrust.
Motor—1/6 to 1½ hp. Control—Temperature. Make—Penn, Bishop & Babcock.
Method of cooling—Air. Condenser—Fin.
Refrigerant—Sulphur dioxide.
Capacities—150 to 1700 lbs.
Low Side
Dry or flooded system.
Method of cooling—Direct.

Iceless Refrigeration Accessories,
2401 Chestnut St., Philadelphia, Pa.
Belts, brass fittings, copper tubing, rubber accessories, gaskets, compressor parts, motors, brushes, test and recording thermometers and gauges.

Icemaster Co.,
200 Merrimack St., Haverhill, Mass.
Horace R. Sessions, pres.; Irving L. Keith, treas.; Morton R. Milne, sales mgr.; Albert F. Sawyer, chief engr.; Clifford E. Shedd, pur. agt.
Trade name.....Icemaster
Complete refrigeration systems.
High Side
Standard sizes—6. Drive—Belt and gear.
Compressor—Reciprocating. Seal—Diaphragm.
Motor—1/6 to 2 hp. Make—Wagner, Century and Emerson.
Control—Temperature. Make—Mercoid.
Method of cooling—Air. Condenser—Radiator.
Refrigerant—Methyl chloride.
Capacities—125 to 1800 lbs.
Low Side
Standard sizes—10. Dry system.
Method of cooling—Direct.
Expansion valve—Diaphragm.
Capacities—4 to 14 cu. ft.
Freezing trays—3 to 10. Ice cubes—36 to 240.

Illinois Refrigerator Sales Co., Morrison, Ill.
E. A. Smith, pres.; F. L. Smith, vice-pres. and gen. mgr.; H. J. Rendall, secy. and pur. agt.; H. L. Kirberg, treas.; A. W. Collins, sales mgr.; Neal O. Kelly, adv. mgr.; L. D. Hocraffer, prod. mgr.
Trade name ..... Illinois
Domestic refrigeration cabinets, sizes.....8
Food capacities.....4.8 to 12 cu. ft.
Construction .....Steel and porcelain
Insulation ..... Dry-Zero
Gaskets ..... Wirfs
Finish (exterior)..Enamel, lacquer and porcelain
Finish (interior).....Enamel and porcelain
(See Advertisement on Page 18)

Imitation Food Products Co.,
107 Lawrence St., Brooklyn, N. Y.
Imitation food products for refrigerator display.
(See Advertisement on Page 48)

Imperial Brass Co.,
565 S. Racine Ave., Chicago, Ill.
C. H. Benson, sales mgr.
Brass forged fittings, tubing cutters, flaring, refacing, bending and service tools. Welding equipment.
(See Advertisement on Page 36)

Independent Pneumatic Co., Aurora, Ill.
Electric pneumatic tools.

Industrial Brownhoist Corp.,
4403 St. Clair Ave., Cleveland, Ohio.
Cranes and hoists.

Ingersoll Machine Co., Rockford, Ill
Milling machines.

Ingersoll Rand Co.,
11 Broadway, New York, N. Y.
Air and ammonia compressors.

Insulation Cork Co.,
200 Broadway, New York, N. Y.
Corkboard insulation.

Insulite Co., 737 Conway Bldg., Chicago, Ill.
D. D. Grassick, mgr. industrial sales.
Trade name.....Insulite
All wood fiber board insulation.

International Filter Co.,
333 West 25th Place, Chicago, Ill.
Filters.

International Nickel Company, Inc., The
67 Wall St., New York, N. Y.
J. F. McNamara, sales mgr.
Trade name.....Monel Metal
Monel Metal and Nickel. Monel Metal for angle and corner trim, bases, facings, linings, screws, nails, and parts, such as diaphragms and valve trim.

International Screw Co.,
2751 W. Kirby Ave., Detroit, Mich.
William Clyde Nelson, secy. and treas.
Steel and brass machine screws and nuts.

Ireland & Mathews Mfg.,
Beard & Chatfield Sts., Detroit, Mich.
Gaskets, cap screws and bolts.

Isko Co., 2362 Clybourn Ave., Chicago, Ill.
Trade name.....Isko
Complete refrigeration systems.
High Side
Standard sizes—2. Drive—Direct.
Compressor—Rotary.
Seal—Plastic packing. Make—Cooke.
Motor—¼ to 3 hp. Make—Century, G. E. and Emerson.
Control—Pressure and temperature. Make—Penn.
Method of cooling—Water. Water valve—Pressure. Make—Cash Valve.
Refrigerant—Sulphur dioxide.
Capacities—100 to 2500 lbs.
Low Side
Dry or flooded system.
Method of cooling—Direct or indirect.

J

Jack Frost Refrigeration, Ltd.,
347 Sorauren Ave., Toronto, Ont., Canada.
Trade name.....Jack Frost
Complete refrigeration systems.
High Side
Standard sizes—9. Drive—Direct.
Compressor—Rotary.
Seal—Spring. Make—Cooke Seal Ring.
Motor—1/6 to 5 hp. Make—Century.
Control—Temperature and pressure. Make—Mercoid, Time-O-Stat.
Method of cooling—Air and water. Water valve—Electric. Make—Automatic Switch.
Condenser—Plain tube, fin coil, radiator type.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—125 to 4000 lbs.
Low Side
Standard sizes—12. Dry or flooded system.
Method of cooling—Direct or indirect.
Expansion valve—Diaphragm or bellows.
Float valve—Low side. Capacities—8 to 56 cu. ft.
Freezing trays—1 to 16. Ice cubes—28 to 432.

Jarrow Products Corp.,
143 W. Austin St., Chicago, Ill.
Harry W. Jarrow, pres.
Trade name .....Jarrow
Rubber door gaskets. Sponge rubber specialties. Rubberized door gaskets.
(See Advertisement on Page 42)

Jeffrey Mfg. Co., 959 N. 4th St., Columbus, Ohio
C. O. McFadden, sales mgr., matl. hdlg. div.
Conveyors, handling equipment.

Jewett Refrigerator Co., Buffalo, N. Y.
E. B. Jewett, pres. and gen. mgr.; C. F. Gerhardt, vice-pres. and prod. mgr.; B. A. Simon, secy.; F. C. Gerhardt, treas.; Geo. J. Gaffney, sales mgr. and adv. mgr.; C. F. Haunz, chief engr.; B. A. Simon, pur. agt.
Trade name.....Jewett
Domestic refrigeration cabinets, sizes.....37
Food capacities.....7.5 to 45 cu. ft.
Insulation ..... Corkboard
Finish (exterior).....Enamel
Finish (interior).....Solid porcelain

Johns Manville, Inc.,
292 Madison Ave., New York, N. Y.
Asbestos products.

J-T Manufacturing Co.,
5200 Centennial Blvd., Nashville, Tenn.
W. B. Evans, pres.; M. H. Wright, vice-pres.; F. C. Hightower, gen. mgr. and prod. mgr.; W. M. Harris, secy. and treas.; K. A. Gerst, sales mgr. and chief engr.
Trade name ..... Temco
Domestic refrigeration cabinets, sizes.....7
Food capacities.....5 to 12 cu. ft.
Construction.....Steel and wood
Insulation ..... Corkboard
Hardware..Grand Rapids Brass and Winters & .....Crampton
Gaskets .....Jarrow and Wirfs
Finish (exterior).....Porcelain
Finish (interior).....Porcelain

K

Kalamazoo Vegetable Parchment Co.,
Kalmazoo, Mich.
Parchment and wax refrigerator paper.
(See Advertisement on Page 21)

Kant Slip Plier & Tool Co.
6036 Wentworth Ave., Chicago, Ill.
A. C. Allan, sales mgr.
Alloy steel pliers.

Keeler Brass Co.,
955 Godfrey Ave., Grand Rapids, Mich.
Cabinet hardware.

Kelvinator Sales Corporation,
14250 Plymouth Road, Detroit, Mich.
George W. Mason, pres. and gen. mgr.; H. W. Burritt, vice-pres. in charge of sales; H. A. Lewis, treas.; J. S. Sayre, sales mgr.; Earl Lines, adv. mgr.; Edward Heitman, chief engr.; G. M. Evans, works mgr.; William B. Walker, Jr., pur. agt.
Trade name.....Kelvinator
Complete electric refrigeration systems, domestic and commercial, including milk coolers, ice cream cabinets and refrigerating equipment for water coolers.
High Side
Standard sizes—17. Drive—Belt.
Compressor—Reciprocating. Seal—Bellows.
Motor—1/6 to 1 hp.
Control—Pressure and temperature.
Method of cooling—Air and water.
Water valve—Pressure. Condenser—Radiator.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—75 to 1060 lbs.
Low Side
Standard sizes—34. Dry or flooded system.
Method of cooling—Direct or indirect.
Expansion valve—Bellows. Float valve—Low side.
Capacities—4 cu. ft. up.
Freezing trays—2 to 9. Ice cubes—42 to 243.
Domestic refrigeration cabinets, sizes.....10
Food capacities.....4.7 to 12.1 cu. ft.
Construction .....Wood, steel
Insulation ..... Corkboard
Finish (exterior).....Lacquer, porcelain
Finish (interior).....Enamel, porcelain
Commercial refrigeration cabinets.
(See Advertisement on Page 9)

Kerotest Manufacturing Co.,
2525 Liberty Ave., Pittsburgh, Pa.
J. S. Forbes, treas.
Trade name.....Kerotest
Forged brass fittings, forged brass valves with single or double shutoff, three-way valves, packless, pressure relief and cylinder valves and fusible safety plugs.
(See Advertisement on Page 12)

Keokuk Refrigerating Co.,
12th & Johnson Sts., Keokuk, Iowa.
G. E. Weissenburger, pres. and gen. mgr.; J. Dillon, secy. and treas.; G. L. Weissenburger, sales mgr. and chief engr.; G. M. Berryhill, pur. agt.
Trade name.....Keokuk
High Side
Complete refrigeration systems.
Standard sizes—4. Drive—Gear and direct.
Compressor—Reciprocating. Seal—Bellows.
Motor—1/6 to ⅓ hp. Make—G. E. and Century.
Control—Temperature.
Method of cooling—Air. Condenser—Flat tube.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—100 to 250 lbs.
Low Side
Standard sizes—7. Dry system.
Method of cooling—Direct.
Expansion valve—Diaphragm.
Capacities—4 to 55 cu. ft.
Freezing trays—2 to 6. Ice cubes—36 to 126.

Knight Co., Stanley H.,
218 W. Superior St., Chicago, Ill.
Soda fountains and back bars.

Koch Butchers' Supply Co.,
North Kansas City, Mo.
Trade name ..... Koch
Commercial wall and walk-in coolers and display cases.
(See Advertisement on Page 30)

Kropp Forge Co.,
5300 Roosevelt Rd., Chicago, Ill.
Roy A. Kropp, vice-pres.
Large and small crankshafts and drop forgings.

Kulair Corporation,
Kensington Ave. & M St., Philadelphia, Pa.
W. W. Moss, pres.; E. D. Dunning, vice-pres. and chief engr.; E. S. Lape, gen. mgr. and sales mgr.; Emmor Roberts, treas.; L. Leafstrom, prod. mgr.; William Vaughn, pur. agt.
E. S. Lape, gen. sales mgr.
Trade name.....Kulair
Complete refrigeration systems. Freezing units.
High Side
Standard sizes—22. Drive—Belt.
Compressor—Reciprocating. Seal—Sylphon.
Motor—1/6 to 3 hp. Make—Wagner and G. E.
Control—Temperature and pressure. Make—Time-O-Stat, American Radiator and Penn.
Method of cooling—Air and water.
Water valve—Electric, solenoid.
Condenser—Fin tube radiator.
Refrigerant—Sulphur dioxide, methyl chloride.
Capacities (ice melting)—95 to 2590 lbs.
Low Side
Standard sizes—8. Dry or flooded system.
Method of cooling—Direct.
Expansion valve—Bellows. Make—American.
Float valve—Low side. Make—Fedders.
Capacities—1 to 40 cu. ft.
Freezing trays—4 to 18. Ice cubes—84 to 378.
(See Advertisement on Page 28)

Kurz-Kasch Co., S. Broadway, Dayton, Ohio.
Moulders of Bakelite, Beetle and Lumarith.

L

La Crosse Refrigerator Corp., La Crosse, Wis.
R. G. Samuels, pres. and treas.; Adolph Samuels, vice-pres. and sales mgr.; H. M. Stokke, gen. mgr. and secy.
Trade name ..... La Crosse
Domestic refrigeration cabinets, sizes.....3
Food capacities.....5 to 10 cu. ft.
Construction ..... Steel
Insulation .....Balsam Wool and Cork
Hardware .....Grand Rapids Brass
Gaskets ..... Bosley
Finish (exterior) ..... Enamel
Finish (interior) .....Enamel or porcelain

Landis Tool Co., Waynesboro, Pa.
Cylindrical grinding machines.

Lansing Sales Co.,
24 Narvard St., Boston, Mass.
H. E. Folger, pres.
Padded moving covers and lifting straps.

Larkin-Warren Refrigerating Corp.,
519 Fair St., S. E., Atlanta, Ga.
V. P. Warren, pres.
Trade name.....Larkin
Larkin 100% aluminum plate, vertical surface coils, (commercial type only) for dry expansion and flooded type equipment.

Le Blond Machine Tool Co., Cincinnati, Ohio.
Automatic multi-cut and engine lathes, coffer grinders.

Lees Co., John,
241 Georgia St., Indianapolis, Ind.
Cabinet trimming and corner pieces.

Leland Electric Co.,
218 N. St. Clair St., Dayton, Ohio.
Fractional horsepower motors.
Rotary convertors for conversion of direct current to alternating current.
(See Advertisement on Page 21)

Leland & Gifford Co., Worcester, Mass.
Machine tools, tapping machines, drill presses.

Leonard Refrigerator Co.,
1545 Clyde Park Ave., Grand Rapids, Mich.
G. W. Mason, pres.; August H. Jaeger, vice-pres. and sales mgr.; Holt Hollinger, adv. mgr.; M. J. Goulooze, chief engr.; M. A. Vining, prod. mgr.; W. B. Walker, Jr.
Trade name .....Leonard
Domestic refrigeration cabinets, sizes.....44
Food capacities .....3.53 to 54.22 cu. ft.
Finish (exterior) .....Porcelain, lacquer
Finish (interior) .....Porcelain, enamel
Commercial wall coolers and display cases.

Lewis Asphalt Engineering Corp.,
30 Church St., New York, N. Y.
Trade name.....Karnak, Krodeproof, Korkseal
Special purpose asphalts and asphalt emulsion for insulation, waterproofing, dampproofing, frost proofing and pipe line protection.

Liberty Welding & Mfg. Co.,
4300 12th St., Detroit, Mich.
J. K. Smith, pres.
Trade name.....Liberty
Welded frames, liquid receivers.

Ligonier Refrigerator Division,
Allied Store Utilities Co.
Ligonier, Ind.
Commercial wall and walk-in coolers and display cases.

Lima Sheet Metal Products Co.,
Charles St. & Pennsylvania R. R., Lima, O.
H. W. Wheatley, gen. mgr.
Ice cube freezing trays, machine bases, stampings, including porcelain enamel ware.

Lincoln Brass Co.,
2067 12th St., Detroit, Mich.
Brass castings.

Lincoln Electric Co., Cleveland, Ohio.
C. M. Taylor, vice-pres.
Motors and welders.

Lindell Drop Forge Co.,
S. Logan St., Lansing, Mich.
Crankshafts and connecting rods.

Linderme Tube Co.,
1291 E. 53rd St., Cleveland, Ohio.
J. H. Hackenburg, sales mgr.
Copper tubing.

Link Belt Co.,
910 S. Michigan Ave., Chicago, Ill.
Elevating, conveying and power transmitting equipment.

Liquid Carbonic Corp.,
3100 S. Kedzie Ave., Chicago, Ill.
Soda fountains and bottled beverage cooler.

Liquid Cooler Corp.,
6527 Russell St., Detroit, Mich.
Trade name.....Temprite
Water and beverage coolers. Cooling units for single or multiple hook-up installed within fixtures of either wall or pedestal types. Cabinet models for remote or self-contained installation. Beverage coolers are made in one, two and three coil models for handling various kinds of beverages.
(See Advertisement on Page 39)

Little Bros. Foundry Co.,
24th & Connor St., Port Huron, Mich.
R. R. Harwood, sales representative, 410 Donovan Bldg., Detroit, Mich.
Gray iron and semi steel castings.

Liver & Co., 1502 Capital Ave., Omaha, Neb.
Commercial refrigeration cabinets.

Loeber Co., H. G.,
151 E. 126th St., New York, N. Y.
Ice cream cabinets.

Lorillard Refrigerator Co.,
85 Grand St., Kingston, N. Y.
Commercial wall and walk-in coolers, display cases and special refrigeration cabinets.

Louisville Refrigerator Co.,
4460 Louisville St., Louisville, Ky.
Trade name .....White Seal
Domestic refrigeration cabinets, sizes.....4
Capacities .....2.9 to 4.6 cu. ft.
Construction .....Metal and wood
Insulation ..... Corkboard
Hardware.....Grand Rapids Brass
Gaskets ..... Dennis
Finish (exterior) .....Lacquer
Finish (interior) .....Enamel

W. G. Loveday Co., Salem, Mass.
Metallic thermometers.

Lovejoy Tool Co., Inc., Springfield, Vt.
Inserted-blade milling cutters.

Lowe Corp., Joe, Brooklyn, N. Y.
Ice cream cabinets.

Lowerator Mfg. Co.,
112 Pearl St., Brooklyn, N. Y.
Material handling equipment.

Luers, Inc., 1022 Maple St., Detroit, Mich.
P. H. Dunnigan, sales representative.
Trade name.....Luers
Cutting-off tools for use on automatic and hand screw machines, turrett and engine lathes.

Luse Stevenson Co.,
307 N. Michigan Ave., Chicago, Ill.
D. C. Luse, pres.
Trade name.....Reliable Corkboard
Corkboard insulation.

M

Maas & Waldstein Co.,
488 Riverside Ave., Newark, N. J.
Lacquer primers, oil primers, lacquer enamels and thinners.
(See Advertisement on Page 47)

MacAndrews & Forbes Co.,
200 Fifth Ave., New York, N. Y.
Wm. J. Parrot, Jr., sales mgr. Maftex dept.
Trade name.....Maftex
Refrigerator board. (Basic material, licorice root fibre).

Mace & Co., Inc., L. H.
55 E. 150th St., New York, N. Y.
Samuel Steinfeld, pres.; Ralph Redell, gen. mgr. and pur. agt.; William Lurie, secy.; Lew Hutzler, treas.
Trade name ..... Mace
Domestic refrigeration cabinets, sizes.....3
Food capacities .....5 to 7 cu. ft.
Construction .....Metal, wood
Insulation ..... Macetex
Hardware .....Grand Rapids Brass, Dent
Gaskets .....Jarrow
Finish (exterior) .....Lacquer, enamel, varnish
Finish (interior) .....Enamel, porcelain

Manning Mfg. Co., Rutland, Vt.
Ice cream cabinets and milk coolers.

Manufacturers Equipment Co.,
4545 West Lake St., Chicago, Ill.
Chas. George, pres.
Collapsible taps, air chucks.

Marathon Electric Mfg. Co.,
32 Island St., Wausau, Wis.
Trade name.....O. K.
Repulsion-induction motors, split phase and direct current motors.

Marinette Show Case Co., Marinette, Wis.
Commercial display cases.

Markwell Mfg. Co.,
200 Hudson St., New York, N. Y.
W. Drypolcher, engr.
Gasket and insulation tackers and staples.

Marsh & Co., James P.
2073 Southport Ave., Chicago, Ill.
Trade name.....
....Marsh, General Instrument, Merkustat
Gages and mercury switches.

Master Electric Co., Dayton, Ohio.
W. R. Clements, vice-pres.
Trade name.....Master
Motors, 1/20 to 10 hp.

Mathieson Alkali Works,
250 Park Ave., New York, N. Y.
R. V. Quinn, asst. mgr. of sales.
Trade name.....Mathieson
Anhydrous ammonia.

Mattatuck Mfg. Co.
E. Main St. & Southmayd Road, Waterbury, Conn.
Trade name.....Indian Glide
Gliders for bottoms of cabinets.

May Screw Products,
2157 Howard Ave., Detroit, Mich.
Small machined parts.

McCord Radiator & Mfg. Co.,
2587 E. Grand Blvd., Detroit, Mich.
R. M. Hyde, sales mgr.
Spiral fin tubing, spiral fin tube condensers and cooling coils.
(See Advertisement on Page 38)

McCray Refrigerator Co., Kendallville, Ind.
E. E. McCray, pres.; H. McCray, vice-pres.; H. M. Stewart, gen. mgr.; J. W. Hart, secy.; R. E. Davis, treas.; J. T. Wassell, sales mgr.; R. J. Rehwinkel, adv. mgr.; G. J. Hopkins, chief engr.; Glen Henry, prod. mgr.; V. I. Stoeckley, pur. agt.
Trade name ..... McCray
Domestic refrigeration cabinets, sizes.....4
Food capacities .....5 to 20 cu. ft.
Construction ..... Wood, metal
Insulation ..... Corkboard
Finish (exterior) .....Porcelain, oak
Finish (interior) ..... Porcelain
Commercial wall and walk-in coolers and display cases.
(See Advertisement on Page 13)

McCrosky Tool Corp.,
1345 Main St., Meadsville, Pa.
Reamers and adjustable chucks.

McKean Co.,
5925-27 Baum Blvd., Pittsburgh, Pa.
Edgar D. McKean, pres.
Trade name.....McKean
Low side units.

McMullen Tool & Supply Co.,
37 E. Woodbridge St., Detroit, Mich.
Reamers, milling cutters.

McLaren Screw Products Co.,
522 15th St., Detroit, Mich.
Fittings in bronze, steel, brass and Monel Metal.

McNaughton-McKay Co.,
313 W. Jefferson Ave., Detroit, Mich.
Electrical supplies.

Melliser-Hayward Co.,
680 Tenth Ave., New York, N. Y.
Spray booths, paint equipment.

Mechana-Kold Corp., Bay Shore, N. Y.
S. A. Limpert, pres. and sales mgr.; A. S. Limpert, vice-pres. and pur. agt.; R. J. Limpert, gen. mgr. and chief engr.; William Ferguson, secy.; W. P. Heinen, treas.
Trade name.....Mechana-Kold
Complete refrigeration systems.
High Side
Standard sizes—2. Drive—Belt.
Compressor—Reciprocating. Seal—Floating ring type. Control—Thermostat.
Motor—1/6 to ⅓ hp. Make—Wagner, Century and Dayfan.
Method of cooling—Air. Condenser—Fin coil.
Refrigerant—Methyl chloride.
Capacities (ice melting per hr.)—5 to 10 lbs.
Low Side
Standard sizes—5. Dry system.
Method of cooling—Direct.
Expansion valve—Bellows. Make—American.
Capacities—4½ to 25 cu. ft.
Freezing trays—2 to 6. Ice cubes—48 to 144.

Merchant & Evans,
2035 Washington St., Philadelphia, Pa.
Trade name.....M. & E.
Complete refrigeration systems.
High Side
Standard sizes—7. Drive—Belt.
Compressor—Reciprocating.
Seal—Bellows. Make—Bishop & Babcock.
Motor—1/6 to 1½ hp. Make—Wagner.
Control—Pressure and temperature. Make—American Radiator.
Method of cooling—Air. Condenser—Radiator.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—100 to 1000 lbs.
Low Side
Standard sizes—23. Flooded system.
Method of cooling—Direct. Float valve—Low side.
Expansion valve—Bellows. Make—American.
Freezing trays—2 to 30. Ice cubes—56 to 360.

Mercoid Corp.,
564 W. Adams St., Chicago, Ill.
J. W. Owens, vice-pres.
Trade name.....Mercoid
Thermostats, high pressure safety cut-out, panel control and ammonia gauges.

Metal Glass Products Co.,
1 Reed St., Belding, Mich.
I. E. Colvin, sales representative.
Trade name.....Metal Glas
Cabinet liners and porcelain products.

Metal Saw & Machine Co., Inc.
40 Napier St., Springfield, Mass.
Fred T. Ley, pres.; Stephen S. Taft, vice-pres.; H. L. Washburn, gen. mgr. and secy.
Coldak refrigerating machines.

Metz Products Corp.,
3051 Rosslyn St., Los Angeles, Calif.
Trade Name ..... Metz
Domestic refrigeration cabinets.

Michigan Tool Co.,
147 Jos. Campau, Detroit, Mich.
Gear hobs, gear shaper cutters, milling cutters, side milling and face milling cutters, end mills, woodruff keyway cutters, metal slitting saws, tool bits, tungsten carbide tools, cutting tool vises and special tools.

Midwest Tool & Mfg Co.,
2360 W. Jefferson, Detroit, Mich.
Reamers, boring tools, light tools.

Milburn Refrigerator Co.,
1908 Reed Street, Kalamazoo, Mich.
Trade name ..... Kalamazoo
Commercial wall and walk-in coolers, display cases and florist refrigeration cabinets.

Miller Rubber Co. of New York,
S. High St., Akron, Ohio.
Gaskets, panel seal, sponge rubber gaskets, hard rubber insulation strips, bolts and motor mounting.

Millers Falls Co., Millers Falls, Mass.
Wire wheel brushes, electric drills, grinders, sanders, screw drivers, hole saws, bits and hack saws.

Mitchell Pattern Works,
2725 Newark, Detroit, Mich.
Wood patterns for forgings.

Mitycold Corporation,
111 W. Bay St., Jacksonville, Fla.
Complete refrigeration systems.
Trade name.....Mitycold
High Side
Compressor—Reciprocating. Drive—Direct.
Motor—1/6 to ½ hp. Make—Westinghouse.
Control—Temperature. Make—Bishop & Babcock.
Method of cooling—Air. Condenser—Fin coil.
Refrigerant—Sulphur dioxide, methyl chloride.
Capacities—100 to 250 lbs.
Low Side
Standard sizes—2. Flooded system.
Method of cooling—Direct.
Float valve—Low side. Make—American.
Capacities—4½ to 40 cu. ft.
Ice cube trays—2 to 10. Ice cubes—60 to 300.

Modern Machine Works, Inc.,
196 Milwaukee St., Milwaukee, Wis.
Crankshafts, transmissions and eccentrics.
(See Advertisement on Page 43)

Monarch Machine Tool Co., The, Sydney, Ohio.
F. C. Dull, secy.
Standard screw cutting, tool room, semi or full automatic, or single purposes lathes.

D. E. Morand Machinery Co.,
6505 Grand River Ave., Detroit, Mich.
Lathes, punches, shears, rolls, reamers, belts, heavy machinery.

Mortex Co., The, Straus Bldg., Chicago, Ill.
E. E. Mortell, pres.
Trade name.....Mortex
Insulation.

Moto Meter Gauge & Equipment Corp.,
Wilbur Ave., Long Island City, N. Y.
Alfred Weiss, sales mgr. industrial div.
Temperature indicating and recording instruments.

Motor Tool Specialty Co.,
4450 John R. St., Detroit, Mich.
Wheel pullers, socket wrenches, valve lifters, vacuum grip pliers, punches, end wrenches.

Motors Metal Mfg. Co.,
5936 Milford St., Detroit, Mich.
Geo. S. Burke, asst. sales mgr.
Metal stampings and welded parts. Angle iron bases, guards, exterior steel panels for domestic cabinets. Also make ice cream cabinets and parts.
(See Advertisement on Page 38)

Mueller Brass Co., Port Huron, Mich.
Leon M. Young, sales promotion engr.; D. M. Irwin, refrigeration sales.
Valves and fittings, seamless brass and copper tubing, screw machine products, brass rod, welded rod, brass and copper forgings, special alloys, "600" bearing metal for connecting rods and seal rings.
Mueller Co., Decatur, Ill.
Brass fittings.
(See Advertisement on Page 33)

Mullins Mfg. Corp., Salem, Ohio.
M. F. Booth, sales engr.; S. J. Menzel, sales mgr.
Evaporators, complete cabinet linings, vitrous enameled products and stampings.

Mundet & Son, L.,
1161 8th St., New York, N. Y.
Cork insulation.

N

Nagle Sheet Metal Works,
108 Prospect St., Herkimer, N. Y.
Trade name.....Nagle
Submerged and Whirlpool type milk coolers.
(See Advertisement on Page 45)

Narragansett Machine Co., Pawtucket, R. I.
Albert J. Thornley, pres. and gen. mgr.; Albert E. Thornley, vice-pres. and chief engr.; James W. Thornley, secy. and treas.; C. A. Bryant, adv. mgr.; George A. Watson, pur. agt.
Trade name.....Chilrite
Complete refrigeration systems.
High Side
Standard sizes—4. Compressor—Rotary gear.
Drive—Direct, rotary gear.
Seal—Revolving. Make—Cooke.
Motor—1/6 to ¾ hp. Control—Temperature.
Method of cooling—Air. Condenser—Fin tube.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—72 to 700 lbs.
Low Side
Standard sizes—18. Dry or flooded system.
Method of cooling—Direct or indirect.
Expansion valve—Diaphragm. Float valve—Low side.
Capacities—5 to 125 cu. ft.
Freezing trays—2 to 8. Ice cubes—54 to 144.

National Electric Refrigeration Corp.,
Scranton, Pa.
Complete refrigeration systems.

National Ammonia Co., Inc.,
Frankford Post Office, Philadelphia, Pa.
Anhydrous ammonia.

National Brass & Copper Co.,
South side, Lisbon, Ohio.
B. Goldsmith, pres.
Copper in sheets, rolls, plates and strips.
Trade name.....National

National Broach Co., Dayton, Ohio.
Broaches, burnishers and cutter bars.

National Copper & Smelting Co.,
12120 Euclid Ave., Cleveland, Ohio.
Homer B. Smith, vice-pres.; Curtis Lee Smith, sales mgr.
Trade name.....Flawless
Copper tubing.

National Electric Products Corp.,
Industrial Dept., 1110 Fulton Bldg., Pittsburgh, Pa.
F. G. Felix, mgr. industrial dept.
Trade names..Indestructo, Flexsteel, Sherarduct
Portable cord, armored wiring harnesses, flexible conduit, fittings for cable and conduit.

National Lead Co.,
111 Broadway, New York, N. Y.
White lead, babbitt and solder and lead tubing.

National Lock Co., Rockford, Ill.
Cap, machine and wood screws, and cabinet hardware.

National Pipe Bending Co.,
110 River St., New Haven, Conn.
R. O. Abbott, pres.
Pipes, bends and coils.

National Screw & Mfg. Co.,
2440 E. 75th St., Cleveland, Ohio.
Cap screws and small machined parts.

National Vulcanized Fibre Co.,
Maryland Ave. & Beech St., Wilmington, Del.
H. C. Hackett, sales mgr.
Trade name.....Phenolite
Phenolite for electrical insulation, door tracks and slides on display cases and for trimming display cases.

Nelson Mfg. Co., C.
2310-16 Division St., St. Louis, Mo.
Ice cream cabinets.

New Departure Mfg. Co., The, Bristol, Conn.
R. L. Brown, engr.
Trade name.....New Departure
Ball bearings.

New Haven Quilt & Pad Co.,
82 Franklin St., New Haven, Conn.
Refrigerator hood covers with web harness.

Niagara Machine & Tool Co.,
637 Northland Ave., Buffalo, N. Y.
Power presses, shears and sheet metal working machines and tools.

Norge Corp.
670 E. Woodbridge St., Detroit, Mich.
Howard E. Blood, pres.; R. E. Densmore, sales mgr.
Trade name.....Norge
Complete refrigeration systems.
High Side
Standard sizes—9. Drive—Belt.
Compressor—Rotary. Seal—Pressure type.
Motor—1/6 to 1 hp.
Control—Pressure.
Method of cooling—Air and water.
Condenser—Fin coil. Water valve—Pressure.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—100 to 1000 lbs.
Low Side.
Standard sizes—12. Flooded system.
Method of cooling—Direct. Float valve—Low Side.
Capacities—3.5 to 85 cu. ft.
Freezing trays—2 to 7. Ice cubes—20 to 189.

North American Provision Co.,
Morris & Co., Chicago, Ill.
Anhydrous ammonia.

Norton Co., 1 Bond St., Worcester, Mass.
Alundum and Crystolon grinding wheels, grinding machines, refractories and Alundum polishing abrasive.

Northey Mfg. Co., Waterloo, Iowa
F. L. Northey, pres. and treas.; V. Northey Howe, vice-pres.; J. Lichty Northey, secy.; Allen Snodgrass, prod. mgr.; Don Colton, pur. agt.
Trade name ..... Northey
Commercial wall and walk-in coolers, display cases, florist and special refrigeration cabinets.

North Star Refrigerator Co.,
Chattanooga, Tenn.
G. C. Raoul, pres.; E. Y. Chapin, vice-pres.; R. T. Frazier, secy. and sales mgr.; H. C. Arnold, treas.; T. Rudd Leder, chief engr.; J. M. Alexander, pur. agt.
Domestic refrigeration cabinets.

O

Oberdorfer Brass Co., M. L., Syracuse, N. Y.
Fred Thompson, sales mgr.
Trade name.....Oberdorfer Pumps
Motor-driven centrifugal and rotary pumps.
(See Advertisement on Page 26)

Ohio Rubber Co.,
735 St. Clair St., Cleveland, Ohio.
William A. Reynolds, sales mgr.
Rubber stoppers and belts and crutch tips for condensing unit bases.

Ohio Electric & Control Co.,
5900 Maurice Ave., Cleveland, Ohio.
Motors.

Ohio Pipe Bending & Machine Co.,
3900-10 Trent Ave., Cleveland, Ohio.
Pipe coils and bends of steel, brass and copper pipe. Welded ammonia receivers and pipe headers.

O'Keefe & Merritt Co.,
3700 Mines St., Los Angeles, Calif.
Complete refrigeration systems.
High Side
Standard sizes—2. Drive—Belt.
Compressor — Reciprocating. Seal — Bellows.
Make—Bishop & Babcock.
Motor—1/6 to ½ hp. Make—Wagner, Century.
Control—Temperature. Make—Ranco.
Method of cooling—Air. Condenser—Radiator.
Refrigerant—Methyl chloride.
Capacities—125 to 250 lbs.
Low Side
Standard sizes—4. Dry system.
Method of cooling—Direct.
Expansion valve—Bellows. Make—American.
Capacities—2.5 to 12 cu. ft.
Freezing trays—2 to 8. Ice cubes—56 to 224.

Olson & Co., Samuel,
1238 N. Kostner Ave., Chicago, Ill.
Conveyors of all descriptions.

Olson Mfg. Co.,
54 Commercial St., Worcester, Mass.
Machine screws.

Omaha Fixture & Supply Co.,
11th and Douglass, Omaha, Neb.
Commercial refrigeration cabinets.

Ottenheimer Bros., Inc.,
Fallsway and Hiller Sts., Baltimore, Md.
R. E. Ottenheimer, pres. and gen. mgr.; B. M. Ottenheimer, vice-pres.; S. M. Ottenheimer, secy. and treas.; G. A. Taylor, sales mgr.; W. B. Sechrest, adv. mgr.; J. Rohrer, chief engr.; J. B. Ottenheimer, prod. mgr.; H. B. Kandle, pur. agt.
Trade name.....Reol, Oreole
Domestic refrigeration cabinets, sizes.....5
Construction.....Steel, wood
Insulation ..... Corkboard
Finish (exterior).....Oak
Finish (interior).....Porcelain enamel
Commercial wall and walk-in coolers and display cases.

Osborn Mfg. Co.,
5401 Hamilton Ave., Cleveland, Ohio.
Cleaning brushes.

Oxweld Acetylene Co., Division of Union Carbide & Carbon Corp.,
30 E. 42nd St., New York, N. Y.
Acetylene welding.

P

Page Steel & Wire Co.,
Union Trust Bldg., Pittsburgh, Pa.
Woven wire frames or guards.

Palmer-Bee Co.,
Westminster and G. T. R. R., Detroit, Mich.
Conveyors, escalators.

Parker Ice Machine Co., San Bernardino, Calif.
Trade name.....Parker, Parkerice
Complete refrigeration systems.
High Side
Standard sizes—12. Drive—V-belt.
Compressor—Reciprocating. Seal—Sylphon, ring and metallic.
Motor—¼ to 35 hp. Control—Thermostat and pressure.
Method of cooling—Air and water.
Condenser—Radiator, shell and tube.
Refrigerant—Sulphur dioxide and ammonia.
Capacities (ice melting)—100 lbs. to 30 tons.
Low Side
Dry or flooded system. Float valve—High side.
Method of cooling—Direct or indirect.
Expansion valve—Diaphragm.
Capacities—4 to 1000 cu. ft.
Freezing trays—1 to 9.

Parker & Harper Mfg. Co.,
119 Dewey St., Worcester, Mass.
Screw machine products.

Parker Rust Proof Co.,
2177 East Milwaukee Ave., Detroit, Mich.
Parco Powder, a chemical, which when dissolved in water and maintained at a temperature of 210 deg., provides a rust proofing solution for application on articles made of iron and steel. Bonderite Powder, a chemical, used in producing a solution for providing a rust proof primer on iron and steel articles.

Peck, Stow & Wilcox Co., Southington, Conn.
Metal cutting machinery, small tools, punch presses, shears.

Peerless Ice Machine Co.,
515 W. 35th St., Chicago, Ill.
Chas. C. Kritzer, pres. and treas.; R. W. Kritzer, vice-pres. and gen. mgr.; Henry E. Kritzer, secy.; R. C. Haimbaugh, chief engr.; A. F. Hoesel, prod. mgr.; L. G. Slaman, pur. agt.
Trade name.....Peerless
Complete refrigeration systems.
High Side
Standard sizes—5. Drive—Belt.
Compressor — Reciprocating. Seal — Metallic packing.
Motor—1 to 15 hp. Make—Wagner, G. E.
Control — Pressure and temperature. Make — Penn and Mercoid.
Method of cooling—Water. Water valve—Pressure
Condenser—Galvanized steel submerged.
Capacities (ice melting)—½ to 10 tons.
Refrigerant—Methyle chloride, sulphur dioxide, and ammonia.
Low Side
Standard sizes—5. Dry or flooded system.
Method of cooling—Direct or indirect.
Expansion valve—Diaphragm. Make—Pimco.
Float valve—Low side. Make—Pimco.
Capacities—4 to 25 cu. ft.
Freezing trays—2 to 16. Ice cubes—24 to 448.
(See Advertisement on Page 45)

Peerless Wire Goods Co., Lafayette, Ind.
Electro-weld and woven type shelving.

Penn Electric Switch Co.,
306 12th St., Des Moines, Iowa.
M. E. Henning, sales mgr.
Trade name.....Penn
Temperature and pressure switches, water regulators for ammonia systems, combination water regulators and high pressure safety switches.
(See Advertisement on Page 41)

Pennrich & Co., Inc.,
29 Broadway, New York, N. Y.
Trade name.....Torfoleum
Insulation.

Perfection Stove Co., Cleveland, Ohio.
L. S. Chadwick, pres.; J. C. Wallace, vice-pres.; E. A. Dodd, gen. mgr. and secy.; Edwin Heina, treas.; W. M. Barber, sales mgr.; N. E. Olds, adv. mgr.; Marc Resek, chief engr.; J. S. Beaton, prod. mgr.; A. H. Schrader, pur. agt.
Trade name .....Superfex
Kerosene burning absorption unit for domestic cabinets and milk coolers. Hermetically sealed, semi-automatic.

Peterson Spring Co.,
1660 Beard St., Detroit, Mich.
Coiled wire and flat steel springs.

Pheoll Mfg. Co.,
5700 Roosevelt Road, Chicago, Ill.
Screws, bolts, rivets and nuts.

Phenolic Products Corp., Rockford, Ill.
Molded Bakelite.

Philadelphia Thermometer Co.,
915 Filbert St., Philadelphia, Pa.
Testing instruments.

Phillips Refrigerator Co.,
393 Keele St., Toronto, Ont., Canada
Trade name ..... Phillips
Refrigeration cabinets.

Phoenix Ice Machine Co.,
2711 Church St., Cleveland, Ohio.
M. Bollinger, pres.; A. Novotny, vice-pres.; H. E. Bollinger, gen. mgr. and treas.; H. H. Jeck, secy. and pur. agt.; R. A. Broebel, sales mgr.; F. Rupp, chief engr.
Trade name.....Phoenix
Complete refrigeration systems.
High Side
Compressor—Reciprocating. Drive—Belt.
Motor—½ to 75 hp. Control—Temperature.
Method of cooling—Water.
Condenser—Shell and tube.
Refrigerant—Ammonia.
Capacities (ice melting)—500 lbs. to 50 tons.

Pick & Co., Albert,
208 W. Randolph St., Chicago, Ill.
Commercial refrigeration cabinets and soda fountains.

Pioneer Asphalt Co.,
365 E. Illinois, Ave., Chicago, Ill.
Pioneer asphalt.

H. L. Pitcher Co.,
12400 Strathmoor, Detroit, Mich.
Warehouse trucks, wheels.

Pittsburg Grinding Wheel Co., Rochester, Pa.
Abrasive wheels, safety devices, swing-frame grinding machines.

Polhemus Co., P. B.
110 West 34th St., New York, N. Y.
Commercial display cases.

Porcelain Enamel & Mfg. Co.,
Eastern and Pemco Ave., Baltimore, Md.
Trade name.....Pemco
Porcelain enamels.

Powell Co., William
1224 Draper St., Cincinnati, Ohio.
Air valves.

Pratt & Whitney Co., Hartford, Conn.
W. P. Kirk, gen. sales mgr.
Vertical grinders and shapers, jig borers, drillers, drill presses, die sinkers, profilers, taps, dies, reamers and milling cutters.

Progressive Mfg. Co.,
52 Norwood St., Torrington, Conn.
Screws, nuts and rivets.

Progress Refrigerator Co.,
621 W. Main St., Louisville, Ky.
W. L. Hollis, pres.; W. H. Cloud, vice-pres. and gen. mgr.; John L. Wrege, secy. and treas.; A. J. Young, sales mgr.; G. H. Swearingen, prod. mgr.; W. E. Block, pur. agt.
Trade name ..... Progress
Domestic refrigeration cabinets.

Puffer-Hubbard Mfg. Co.,
26th and 32nd Ave., Minneapolis, Minn.
R. T. Phillips, pres. and gen. mgr.; J. B. Angle, vice-pres.; C. A. Pulver, secy. and treas.
Refrigeration cabinets built to specification.
(See Advertisement on Page 38)

Pulmosan Safety Equipment Corp.,
176 Johnson St., Brooklyn, N. Y.
Frederick Wahlert, pres.; William H. Wahlert, secy.
Trade name.....Pulmosan
Gas masks, sulphur dioxide respirators, goggles and asbestos clothing.

Pure Cork Products Co., Inc.,
418 Cherry St., Philadelphia, Pa.
H. T. Hellbrueck, sales mgr.
Sheet corkboard.

Q

Quaker City Rubber Co.,
Comly & Minor Sts., Philadelphia, Pa.
V-belts.

Quality Mfg. Co., Watertown, Mass.
R. A. Pickens, treas. and managing director.
Pistons, pins, fans and pulleys and compressors.

R

Raiche Manufacturing Co.,
1631 Cordova St., Los Angeles, Calif.
Ice cream freezer and cabinet.

Rauf Mfg. Co., Bogota, N. J.
Trade name.....Alpinice
Complete refrigeration systems.
High Side
Compressor—Reciprocating. Drive—V-belt.
Control—Temperature. Condenser—Fin tube.

Reading Chain & Block Corp.,
2100 Adams, Reading, Pa.
P. K. Howard, sales mgr.
Chain and electric hoists, traveling cranes.

Refrigerating Equipment Co.,
Fourth St. & Greenhill Ave., Wilmington, Del.
S. P. Ker, Jr., pres.; W. G. Finch, sales engr.; H. L. Semans, sales engr.
Trade name.....Glacifer-Knox
Ice cream cabinets, portable hardening rooms, domestic cabinets, lids for ice cream cabinets.

Refrigeration Improved Appliance Co.,
508 First St., Winter Haven, Fla.
H. C. Frierson, mgr.
Ammonia pre-cooler.

Renfrew Refrigerator Co., Ltd.,
Elizabeth St., Renfrew, Ont., Canada
T. A. Low, pres.; F. D. Vickers, vice-pres. and gen. mgr.; D. E. Stone, secy. and treas.; K. Gannon, sales mgr. and adv. mgr.; W. J. Beattie, chief engr. and prod. mgr.; A. M. Bossence, pur. agt.
Trade name ..... Barnett
Domestic refrigeration cabinets, sizes.....11
Food capacities .....3.75 to 20 cu. ft.
Construction ..... Wood
Insulation ..... Corkboard
Hardware..National Lock, Grand Rapids Brass, Winters & Crampton
Gaskets ..... Dennis
Finish (exterior) .....Enamel
Finish (interior) .....Porcelain, enamel

Reid Dairy Supply Co., A. H.,
69th & Haverford Sts., Philadelphia, Pa.
Milk coolers.

Reynolds Spring Co., Jackson, Mich.
John G. Rossiter, sales mgr.
Bakelite and composition parts.

Rex Mfg. Co., Connersville, Ind.
C. C. Hull, pres.: M. L. Hull, vice-pres.; M. R. Hull, factory mgr.; J. M. Heron, secy. and treas.; E. P. Myers, sales mgr.; R. H. Crawford, adv. mgr.; R. W. Hull, chief engr.; C. Riggs, prod. mgr.; W. O. Hull, pur. agt.
Trade name ..... Rex
Domestic refrigeration cabinets, sizes.....5
Food capacities .....4 to 15 cu. ft.
Construction ..... Steel
Insulation ..... Corkboard
Hardware .....Grand Rapids Brass
Finish (exterior) .....Lacquer, porcelain
Finish (interior) .....Enamel, porcelain
(See Advertisement on Page 17)

Rhinelander Refrigerator Co.,
Rhinelander, Wis.
R. A. Riek, gen. mgr. and secy.
Trade name ..... Artite, Rhinelander
Domestic refrigeration cabinets.....18
Food capacities .....3.75 to 20 cu. ft.
Construction ..... Wood, metal
Insulation.....Dry-Zero and Balsam Wool
Finish (exterior) .....Porcelain, lacquer
Finish (interior) .....Porcelain, enamel
Commercial refrigeration cabinets.

Rhodes & Co., J. H.
157 W. Austin Ave., Chicago, Ill.
Trade name.....Colossus
Felt.

Rice Products, Inc.,
315 Beaubien St., Detroit, Mich.
I. L. Rice, Jr., pres.; T. E. Carpenter, vice-pres. and gen. mgr.; Julian Rice, secy. and treas.; R. G. Nelson, chief engr.; H. C. Vincent, prod. mgr. and pur. agt.
Trade name.....Rice
Complete refrigeration systems.

Rider, P. L., 317 Main St., Worcester, Mass.
Trade name.....Pneu-Dor Seal
Gaskets.

Roberts Tube Works,
2500 Military Ave., Detroiti, Mich.
Seamless copper tubing.

W. S. Rockwell Co.,
50 Church St., New York, N. Y.
Gas furnaces.

Robbins & Myers, Inc., Springfield, Ohio.
Trade name.....R & M
Motors, generators and fans.

Roberts Brass Mfg. Co.,
5435 Fort St., Detroit, Mich.
Trade name.....Roberts
Brass fittings, valves and cocks.

Robinson Refrigerator Works,
3612 W. Pershing Road, Chicago, Ill.
S. J. Robinson, pres.; D. I. Robinson, vice-pres and gen. mgr.; J. A. Robinson, secy. and treas.
Trade name ..... Robinson
Domestic refrigeration cabinets, sizes.....15
Food capacties .....4 to 12 cu. ft.
Construction ..... Steel
Insulation ..... Corkboard
Gaskets ..... Dennis
Finish (exterior) .....Lacquer, porcelain
Finish (interior) .....Enamel, porcelain

Rodale Mfg. Co.,
200 Hudson St., New York, N. Y.
Trade name.....Rodale
Rubber attachment plugs with handles. Bakelite products.

Rodgers Refrigerator Works, Fay,
P. O. Box 2573, Memphis, Tenn.
Commercial refrigeration cabinets.

Roessler & Hasslacher Chemical Co.,
10 East 40th St., New York, N. Y.
Geo. F. Hasslacher, mgr. commercial development div.
Arctic methyl chloride, Ethyl chloride, ceramic enameling, colors and materials, electroplating chemicals.

Romeson Mfg. Corp.,
First National Bank Bldg., Pittsburgh, Pa.
Gray I. Morris, vice-pres. and gen. mgr.
Trade name.....Romeson Romec
Complete refrigeration systems.
Pumps and rotary compressors.
High Side
Standard sizes—2. Compressor—Rotary.
Drive—Direct. Seal—Cooke.
Motor—⅓ to 1 hp. Make—Wagner.
Control—Temperature. Make—American, Penn.
Method of cooling—Water.
Water valve—Pressure. Condenser—Plain tube.
Refrigerant—Sulphur dioxide.
Capacities—250 to 850 lbs.
Low Side
Flooded or dry system. Method of cooling—Direct.
Expansion valve—Bellows. Make—American.
Float valve—Low side. Make—American.
Capacities—150 to 700 cu. ft.
Freezing trays—3 to 30. Ice cubes—36 to 240.

Roller-Smith Co.,
233 Broadway, New York, N. Y.
Electrical control devices.

Rome Copper & Brass Co., Rome, N. Y.
Seamless copper tubing.

Rome-Hollow Wire & Tube Co., Rome, N. Y.
Seamless copper tubing.

Rome-Turney Radiator Co., Rome, N. Y.
Trade name.....Rome
Seamless copper tubing condensers, seamless copper tube bends and formed tube stampings and sheet metal parts.
(See Advertisement on Page 45)

Rome Wire Co., Rome, N. Y.
Insulated wire.

Roth Brothers & Co.,
1400 W. Adams St., Chicago, Ill.
Division of Century Electric Co., St. Louis, Mo.
Direct current motors, AC. and DC generators, motor generator sets, chargers and rotating converters.

Ruddy Mfg. Co., Ltd., Brantford, Ont., Canada
Trade name ..... Brantford
Domestic and commercial refrigeration cabinets, walk-in coolers and display counters.

S

Safety Regulator Co.,
2840½ Guirado St., Los Angeles, Calif.
E. T. Ford, sales mgr.
Protectostats and temperature control equipment.

Sanderson-Harold Co., Ltd., Paris, Ont.
John Harold, pres. and gen. mgr.; H. W. MacManon, vice-pres.; E. M. Harold, secy. and treas.; J. P. Gregory, prod. mgr. and pur. agt.
Trade name ..... Paris
Domestic refrigeration cabinets, sizes.....41
Food capacities .....2.5 to 38 cu. ft.
Construction ..... Wood
Insulation ..... Corkboard
Hardware.....Grand Rapids Brass, Winters & Crampton
Gaskets ..... Ladore
Finish (exterior) ..... Enamel
Finish (interior) .....Enamel, porcelain

S & S Products Co., Lima, Ohio.
Trade name.....All-Syze
Beverage coolers.

Sargent & Co., New Haven, Conn.
H. Crawford, mgr. special sales div.
Casters, catches, hinges, latches, special parts, grey iron castings, brass, bronze and aluminum castings and wire formings.

Savage Arms Corp., Utica, N. Y.
W. L. Wright, pres.; F. R. Phillips, vice-pres.; F. F. Hickey, gen. mgr.; J. H. Cook, secy.; E. A. MacDonald, treas.; C. A. Baldwin, sales mgr.; R. B. Woolley, adv. mgr.; John Pearce, chief engr.
Complete refrigeration systems for ice cream cabinets.
Trade name.....Savage
High Side
Compressor—Mercury type. Drive—Friction.
Seal—Hermetic. Motor—¼ hp.
Control—Temperature. Condenser—Fin tube.
Method of cooling—Air.
Capacities—2 to 10 hole ice cream cabinets.
Low Side
Flooded system. Float valve—High side.
Method of cooling—Freezing jelly.

Savory, Inc., 90 Alabama St., Buffalo, N. Y.
Trade name ..... Savory
Domestic refrigeration cabinets.
Food capacities .....5 to 13 cu. ft.
Construction ..... Metal
Insulation ..... Corkboard
Gaskets ..... Wirfs
Finish (exterior) ..... Porcelain
Finish (interior) ..... Porcelain

Schlieman Companies, New York, N. Y.
Compressor oils.

Schmidgall & Son, Fred
2163 Barnard St., Cincinnati, Ohio.
Door fasteners.

Schmidt Co., C.,
John and Livingston Sts., Cincinnati, Ohio
J. H. Ahrens, pres. and gen. mgr.; H. C. Ahrens, vice-pres. and adv. mgr.; E. J. Ahrens, secy. and chief engr.; J. A. Geiser, treas. and pur. agt.; A. E. Bogen, sales mgr.
Trade name ..... Thesco
Commercial wall and walk-in coolers and display cases. Domestic refrigeration cabinets built to order. Ice freezing units and drinking water units.

Scientific Instrument Co.,
535 W. Larned, Detroit, Mich.
F. E. Marks, sales engr.
Thermometers.

Scovill Mfg. Co.,
99 Mill St., Waterbury, Conn.
Hinges, brass and steel cap and machine screws, fractional horsepower motors and sheet metal stampings.

Seeger Refrigerator Co., St. Paul, Minn.
John A. Seeger, pres.; Walter G. Seeger, vice-pres. and gen. mgr.; G. R. Seeger, secy. and treas.; John J. Leonard, sales mgr.; Harry G. Webber, asst. sales mgr.; S. Greve, adv. mgr.; R. S. Ahrens, chief engr.; T. Flavelle, prod. mgr.; E. R. Benson, pur. agt.
Trade name ..... Seeger
Domestic refrigeration cabinets, sizes.....20
Food capacities .....4 to 30 cu. ft.
Construction ..... Steel
Insulation ..... Corkboard
Finish (exterior) .....Porcelain, lacquer
Finish (interior) ..... Porcelain
Commercial, sizes.....24
Food capacities.....16 to 71 cu. ft.
(See Advertisement on Pages 6 and 7)

Servel Sales, Inc., Evansville, Ind.
Frank E. Smith, pres.; H. W. Foulds, vice-pres.; V. E. Vining, sales mgr.; A. T. Golding, adv. mgr.
Trade name.....Servel
Complete electric refrigeration systems, domestic and commercial, including water coolers, and models for ice cream cabinets, soda fountains and milk coolers.
High Side
Standard sizes—12. Drive—Belt.
Compressor — Reciprocating. Seal — Rotating syphon.
Motor 1/6 to 1 hp. Make—Wagner, Century, General Electric and Emerson.
Control—Temperature and Pressure.
Method of cooling—Air and water.
Water valve—Pressure. Make—Penn.
Condenser—Radiator and shell types.
Refrigerant—Methyl chloride.
Capacities—75 to 1200 lbs.
Low Side
Standard sizes—23. Flooded system.
Method of cooling—Direct. Float valve—Low side.
Capacities (domestic)—4 to 22 cu. ft.
Freezing trays—3 to 16. Ice cubes—36 to 192.
Domestic refrigeration cabinets.
Food capacities.....4 to 10 cu. ft.
Construction .....Steel and wood
Insulation ..... Corkboard
Finish (exterior) ..... Lacquer
Finish (interior) ..... Porcelain
(See Advertisement on Page 5)

Seiberling Rubber Co., Akron, Ohio.
Rubber belts and stoppers.

Service Recorder Co.,
Hanna Bldg., Cleveland, Ohio.
E. L. Viets, sales mgr.
Trade name.....Servis Recorder
Time recorder for refrigeration motors.

Service Steel Co.,
1435 Franklin St., Detroit, Mich.
Steel tubing.

Shakeproof Lockwasher Co.,
2503 N. Keeler Ave., Chicago, Ill.
Lock washers and locking terminals.

Shepard Niles Crane & Hoist Corp.,
388 Schuyler Ave., Montour Falls, New York.
R. T. Turner, vice-pres. and sales mgr.
Electrical hoisting equipment.

Sherer-Gillett Co., Marshall, Mich.
W. T. Sherer, pres. and sales mgr.; R. P. Sherer, vice-pres.; R. W. Goodrow, secy.; R. F. Grant, treas. and prod. mgr.; K. D. Zenkere, adv. mgr.; G. E. Ruddock, pur. agt.
Trade name .....Sherer
Commercial walk-in coolers and display cases.

Sherman Mfg. Co., Battle Creek, Mich.
Soldering lugs for electric wiring.

Sherwin-Williams Co.,
601 Canal Rd., Cleveland, Ohio.
Paints and varnishes and lacquers.

Signode Steel Strapping Co.,
2600 N. Western Ave., Chicago, Ill.
Trade name.....Signode
Steel strapping, seals and tools for applying the same on shipping containers.

Silverice, Inc.,
280 Broadway, New York, N. Y.
W. S. Glennan, pres.
Trade name.....Silverice
Metal balls used in place of ice cubes in cooling beverages and foods.

Simonds Saw & Steel Co., Fitchburg, Mass.
Tools, saws.

Sinclair Refining Co.,
2540 W. 22nd St., Chicago, Ill.
C. A. Whitman, in charge industrial lubricating sales.
Refrigerating machine oils.

S. K. F. Industries, Inc.,
40 E. 34th St., New York, N. Y.
Trade name.....S. K. F.
Ball and roller bearings.

Smillie & Co., C. M.,
520 E. Larned St., Detroit, Mich.
F. B. Riley, factory representative, 320 Beaubien St., Detroit, Mich.
Flaring tools, tube cutters and reseating tools.

Smith Ice Machine Co.,
655 Second Ave., New York, N. Y.
E. A. Smith, pres.
Complete refrigeration systems.
Trade name.....Smith
High Side
Standard sizes—6. Drive—Direct.
Compressor—Rotary. Seal—Metal.
Motor—¼ to 5 hp. Make—Star.
Control—Pressure. Make—Mercoid.
Method of cooling—Water. Water valve—Pressure.
Condenser—Fin coil within condensing chamber.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—200 to 4500 lbs.

Smoot-Holman Co., Inglewood, Calif.
Trade name ..... Kool-Kase
Commercial display cases.

Snap-On Wrench Co.,
4450 John R. St., Detroit, Mich.
A. M. Croudell, industrial sales representative.
Screw drivers, pliers, punches, chisels, wrenches and small tools.

Solar-Sturges Mfg. Co., Melrose Park, Ill.
R. H. Strickland, gen. sales mgr.
Trade name.....Ultra-Weld
Welded ice cream cans.

Solid Carbonic Co., Ltd.
100 W. 42nd St., New York, N. Y.
Trade name.....Carbonice
Carbon dioxide ice.

Solvay Sales Corp.,
40 Rector St., New York, N. Y.
Trade name.....Solvay
Calcium chloride.

Spalt & Sons, George,
904 Broadway, Albany, N. Y.
Soda fountains.

Sparklets, Inc.,
19 W. 44th St., New York, N. Y.
Frederick Haase, gen. sales mgr.
Trade name.....Sparklets
Syphons for making carbonated beverages; for aerating ice cream mixes; waffle batter, etc.

Spear Stove & Heating Co., James,
1823 Market St., Philadelphia, Pa.
Trade name.....Spear
Ice water generator and low sides. Water cooler cabinets and castings, ice makers, liquid and milk coolers, mercury control and Ripipe fittings for one pipe ice water circulating systems.

Spencer Smith Machine Co., Howell, Mich.
Pistons, piston pins and piston pin set screws.

Square D. Co., 6060 Rivard St., Detroit, Mich.
Trade name.....Square D
Safety switches and controls.

Standard Conveyor Co.,
315 Second Ave., N. W. North St. Paul, Minn.
Conveyors, tiering machines, elevators and spiral chutes.

Standard Oil Co. (Indiana),
910 S. Michigan Ave., Chicago, Ill.
H. J. Saladin, asst. mgr. technical div.
Trade name.....Superla, Stanolind, Standard
Refrigerating machine oils, lubricating oils and greases.

Standard Refrigerator Co., Inc.,
2539 Germantown Ave., Philadelphia, Pa.
R. E. Frederick, pres.; William H. Cutler, vice-pres. and treas.; S. R. Smith, secy.; W. E. Hill, sales mgr.
Commercial wall and walk-in coolers and display cases.

Standard Thermometer, Inc.,
66 Shirley St., Roxbury, Mass.
Edward McWilliams, sales mgr.
Indicating dial thermometers.

Stanley Works, New Britain, Conn.
Hinges and catches.

Stark Pump Co.,
17128 Mt. Elliot Ave., Detroit, Mich.
Circulating water and brine pumps.

L. S. Starrett Co., Athol, Mass.
Tools and precision instruments.

Star Tool & Die Co.,
2520 24th St., Detroit, Mich.
Shop tools.

States Co., The, Hartford, Conn.
H. N. Porter, sales mgr.
Time switches, self-wound.

Steel Craft Mfg. Co.,
4617 Arthington St., Chicago, Ill.
E. F. Gilbert, pres. and treas.
Trade name ..... Steel Craft
Domestic refrigeration cabinets, sizes.....6
Food capacities .....4 to 6.5 cu. ft.
Construction ..... Steel
Insulation ..... Dry-Zero
Hardware .....Grand Rapids Brass
Gaskets ..... Jarrow
Finish (exterior) ..... Lacquer
Finish (interior) .....Enamel, Porcelain

Steel or Bronze Piston Ring Corp.,
546 S. Meridian St., Indianapolis, Ind.
Trade name.....Garsix
Steel and bronze piston rings.

Stevens, Will P.,
1634 Long Beach Ave., Los Angeles, Calif.
Trade name.....Stevens
Refrigerating machinery from ⅛-ton capacity and up.

Stewart Ice Machine Co.,
3631 Avalon Blvd., Los Angeles, Calif.
Complete refrigeration systems.
High Side
Standard sizes—6. Drive V-belt.
Compressor—Reciprocating. Seal—Oil. Make—J. C. B.
Motor—¼ to 7½ hp. Make—U. S., Wagner, Leland.
Control—Pressure. Make—Penn.
Method of cooling—Air and water.
Water valve—Pressure. Make—Safety, Penn.
Condenser—Shell and tube, fin coil.
Refrigerant—Ammonia and sulphur dioxide.
Capacities (ice melting)—50 lbs. to 4 tons.
Low Side
Flooded system. Method of cooling—Direct.
Expansion valves—Diaphragm of bellows type.
Make—Alco, American Radiator.
Float valve—Low or high side.

St. Louis Butchers & Hotel Supply Co.,
15th & Mullanphy Sts., St. Louis, Mo.
Trade name..... Spray Cold
Commercial wall and walk-in coolers and display cases.

St. Louis Pipe Bending Co.,
1020 North Main St., St. Louis, Mo.
Copper coil bending machinery.

Stow Mfg. Co., Inc.,
443 State St., Binghamton, N. Y.
C. F. Hotchkiss, Jr., engr.
Trade name.....Stow
Flexible shafts, electric drills, grinders, polishers and sanding machines.

Strom Bearing Co.,
4535 Palmer St., Chicago, Ill.
M. E. Monk, director of sales.
Ball bearings.

Success Mfg. Co., Gloucester, Mass.
Thomas P. Bolger, pres. and gen. mgr.; William A. Bolger, treas. and pur. agt.
Trade name ..... Success
Domestic refrigeration cabinets, sizes.....7
Construction ..... Metal
Insulation.....Balsam Wool and Corkboard
Finish (exterior) .....Lacquer, enamel
Finish (interior) .....Lacquer, enamel

Sullivan Machinery Co.,
400 N. Michigan Ave., Chicago, Ill.
Air compressors.

Sun Oil Co.,
1608 Walnut St., Philadelphia, Pa.
P. V. Kane, gen. mgr. industrial sales dept.
Trade name.....Suniso Sun Circo
Compressor oils.

Superior Machine & Eng. Co.,
1930 Ferry Park, Detroit, Mich.
Connecting rods.

Superior Seal & Stamp Co.,
1401 Vermont Ave., Detroit, Mich.
Trade name .....Superior
Metal floats and screens.

Superior Sheet Steel Co., Canton, Ohio.
Metal sheets for cabinets.

Surface Combustion Co.,
117 Liberty St., New York, N. Y.
Gas furnaces.

Swift Electric Welding Co., Detroit, Mich.
Spot, seam, electric welding.

T

Tacoma Metal Refrigerators, Inc.,
741 Broadway, Tacoma, Wash.
P. M. Holaday, pres.; K. A. Sanwick, vice-pres. and gen. mgr.; Ruth Edworthy, secy. and treas.
Domestic refrigeration cabinets.
Trade name.....TMR
Construction.....Cork & Insulite
Hardware.....Washington Hardware
Finish (exterior).....Lacquer
Finish (interior).....Enamel
Commercial refrigeration cabinets.

Tacony Steel Co.,
1416 Chestnut St., Philadelphia, Pa.
Die blocks.

Tagliabue Mfg. Co., C. J.,
18 33rd. St., Brooklyn, N. Y.
Wilkinson Stark, div. sales mgr.
Trade name.....TAG
Portable temperature time-operation recorders, portable recording thermometers, pressure gages, pocket and laboratory thermometers.

Taylor Co., Halsey, Warren, Ohio.
Water coolers for remote and self-contained installation.

Taylor-Freezer Corp., Beloit, Wis.
Ice cream freezer and cabinet.

Taylor Instrument Companies, Rochester, N. Y.
Temperature indicating, recording and controlling instruments.

Taylor-Winfield Corp., Warren, Ohio.
Spot and butt welding machines.

Thermwool Products Co.,
360 Furman St., Brooklyn, N. Y.
D. N. Berent, asst. sales mgr.
Trade name.....Thermwool
Insulation.
Commercial wall coolers.

Thomson-Gibb Electric Welding Co.,
Lynn, Mass., and Bay City, Mich.
W. H. Gibb, vice-pres. in charge of sales.
Arc, spot, press, seam, butt, flash, wire fabric and special electric welding machines.

Time-O-Stat Controls Co., Elkhart, Ind.
G. McLarty, div. mgr.
Room temperature instruments, brine tank or coil temperature regulators, high pressure cutouts, magnetic valves and surface switches.

Toledo Machine & Tool Co.,
1420 Hastings St., Toledo, Ohio.
Presses, dies, shears and sheet metal working machinery.

Tork Clocks, Inc.,
12 East 41st St., New York, N. Y.
R. L. Johnson, sales mgr.
Windless clock switches.

Treadwell Co., Inc., M. H.,
140 Cedar St., New York, N. Y.
Water cooler for cooling and recirculating water for ice machines.

Treadwell Tool Co., Greenfield, Mass.
Taps, dies, screw plates, small tools.

Tri-Clover Machine Co.,
P. O. Box 745, Hub Sta., Kenosha, Wis.
Trade name.....Tri-Clover
Hardware and pumps.

Triumph Ice Machine Co.,
110 E. 70th St., Cincinnati, Ohio.
L. C. Hobart, pres. and gen. mgr.; E. W. Hobart, secy. and pur. agt.; G. P. Hunt, treas.; J. O. Schultz, sales mgr. and chief engr.
Trade name.....Triumph
Complete refrigeration systems.
High Side
Compressor—Reciprocating. Drive—Direct or belt.
Seal—Fibrous packing. Control—Temperature.
Method of cooling—Water. Condenser—Shell and tube, double pipe and atmospheric.
Refrigerant—Ammonia.
Capacities (ice melting)—1 to 150 tons.
Low Side
Method of cooling—Direct or indirect.

Trumbull Electric Mfg. Co.,
Woodford Ave., Plainville, Conn.
L. L. Braston, sales mgr.
Safety switches, panel boards, switch boards, and porcelain wiring devices.

Trupar Mfg. Co., 140 Davis, Dayton, Ohio.
Trade name.....Trupar
Complete refrigeration systems. Cooling units.
High Side
Standard sizes—6. Drive—V-belt.
Compressor — Reciprocating. Seal — Against vacuum.
Motor 1/6 to 1½ hp. Make—Master.
Control—Pressure. Condenser—Fin coil.
Method of cooling—Air and water.
Water valve—Pressure or electric. Make—American.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—75 to 1000 lbs.
Low Side
Standard sizes—5. Flooded system.
Method of cooling—Direct. Float valve—Low side.
Capacities—35 to 90 lbs., ice melting effect.
Freezing trays—2 to 4. Ice cubes—56 to 112.

Truscon Laboratories,
Caniff & Grand Trunk R. R., Detroit, Mich.
Lacquers and paints.

Trutulife Wax Products,
1026 Somers St., Milwaukee, Wis.
John R. Manegold, secy. and treas.
Artificial foods for display purposes.

Tuttle's Tite-On Cement Co.,
4507 Ravenswood Ave., Chicago, Ill.
Colored porcelain cement for repairing chipped enamel surfaces.

U

Udylite Process Co.,
3220 Bellevue Ave., Detroit, Mich.
Cadmium plating.

Union Bag and Fibre Corp.,
Woolworth Bldg., New York, N. Y.
Trade name.....Scutan
Insulation. (Basic material kraft paper.)

Union Fibre Sales Co., Winona, Minn.
H. M. Scherer, asst. mgr.
Rockwool blanket composed of Rock Wool Fibres. Rolls of standard widths 24" and 36". Fibrofelt insulating board. Lith insulating board, standard slabs 18"x48". Linofelt quilted insulation.

Union Steel Wire Co., Battle Creek, Mich.
L. B. Genebach, secy.
Wire shelves.

United-American Soda Fountain Co.,
101 Walnut St., Watertown, Mass.
Soda fountains and back bars.

United Cork Companies,
Grant Ave., Lyndhurst, N. J.
L. T. Sibley, sales mgr.
Trade name.....Crescent
Corkboard, cork pipe covering for cold lines, cork brick, granulated cork.

United Tube & Die Co.,
324 Ann St., Hartford, Conn.
Tube bends.

United Wire & Supply Corp.,
Providence, R. I.
H. W. Dittmeyer, sales mgr.
Tubing, silver solder, capillary tubing and dehydrated deoxidized tubing.

Universal Cooler Corp.,
18th & Howard Sts., Detroit, Mich.
G. M. Johnson, pres. and gen. mgr.; J. W. Taylor, vice-pres.; Ford Ballantyne, vice-pres.; A. H. Meinke, secy. and treas.; W. H. Knowles, sales mgr.; Gorton F. Price, adv. mgr.; Harry Thompson, chief engr.
Trade name.....**Universal Cooler**
Complete domestic and commercial electric refrigeration systems with models for ice cream cabinets and special equipment for the conversion of ice and salt cabinets.
High Side
Standard sizes—9. Drive V-belt.
Compressor—Reciprocating. Seal—Bellows.
Motor—1/6 to 1½ hp.. Make—Wagner.
Control—Pressure and thermostat. Make—Penn.
Method of cooling—Air and water.
Water valve—Pressure. Make—Penn.
Condenser—Radiator and coil.
Refrigerant—Methyl chloride.
Capacities—105 to 1200 lbs.
Low Side
Dry system. Method of cooling—Direct.
Expansion valve—Bellows. Make—American.
Freezing trays—2 to 9. Ice cubes—42 to 189.
(See Advertisement on Page 32)

U. S. Gauge Co.,
44 Beaver St., New York, N. Y.
Ammonia pressure gauges.

U. S. Mineral Wool Co.,
280 Madison Ave., New York, N. Y.
Trade name.....**Mineral Wool**
Insulation.
(See Advertisement on Page 42)

U. S. Rubber Co.,
1790 Broadway, New York, N. Y.
Rubber belts and stoppers, rubber tips for compressor base legs, and insulated wire.

Utilities Engineering Institute,
4403 Sheridan Rd., Chicago, Ill.
Home study course on refrigeration.
(See Advertisement on Page 48)

V

Valerius Corp., Jefferson, Wis.
Soda fountains, luncheonettes, soda-sundae cabinets and milk coolers.

Van Deventer, H. R.,
342 Madison Ave., New York, N. Y.
Consulting engineer and patent attorney.
(See Advertisement on Page 47)

Van Dorn Electric Tool Co., Cleveland, Ohio.
Electric drills, tools, buffers.

Vellumoid Co., 54 Rockdale, Worcester, Mass.
Trade name.....**Vellumoid**
Sheet packing and gaskets.

Victor Manufacturing & Gasket Co.,
5750 Roosevelt Road, Chicago, Ill.
Trade name.....**Victorite, Victopac**
Copper and copper-asbestos gaskets. Compressed asbestos sheet gaskets. Fibrous and special alloy gaskets. Asbestos and fibrous packing.

Victor Products Corp.,
Frederick Road, Hagerstown, Md.
James K. Neol, vice-pres.
Trade name.....**Victor**
All metal milk cooling cabinet.
Steel refrigerator shelving for use in large commercial coolers. Steel wire shelving. Standard refrigerator fronts. Hardware, fasteners and hinges. Door gaskets. All types and storage doors, including cooler, freezer, superfreezer, bunker doors and windows. Can and crate passing and ice passing doors and chutes.

Virginia Smelting Co., West Norfolk, Va.
A. H. Eustis, vice-pres.; F. A. Eustis, secy. and treas.; C. W. Johnston, gen. mgr.
Trade name.....**Esotoo**
Sulphur dioxide.
(See Advertisement on Page 16)

Vilter Mfg. Co.,
935 Clinton St., Milwaukee, Wis.
Emil Vilter, pres.; Edward F. Goss, vice-pres.; William O. Vilter, secy. and treas.; W. R. Kremer, sales mgr.; E. T. Reynolds, Jr., adv. mgr.; J. G. Keller, chief engr.
Trade name.....**Vilter**
Complete refrigeration systems.
High Side
Drive—Belt and direct.
Control—Pressure and temperature.
Method of cooling—Water. Water valve—Pressure.
Condenser—Double pipe, shell and tube, and atmosphere.
Refrigerant—Ammonia, carbon dioxide and methyl chloride.
Capacities (ice melting)—1 ton up.
Low Side
Dry or flooded system. Float valve—Low side.
Method of cooling—Direct or indirect.
Expansion valve—Needle.

Vogt Machine Co., Henry
10th & Ormsby St., Louisville, Ky.
Forged steel valves and fittings.

Vogt Refrigeration Co.,
616 Barrett Ave., Louisville, Ky.
David A. Brown, pres.; Thomas F. Moran, vice-pres. and gen. mgr.; E. A. VonRosen, secy. and treas.; M. C. Burnside, sales mgr.; H. C. Hayes, chief engr.; H. B. Fisher, prod. mgr.; A. L. Young, pur. agt.
Trade name .....**Absopure**
Domestic refrigeration cabinets, sizes.....5
Food capacities .....4 to 12 cu. ft.
Construction ..... Steel
Insulation ..... Cork
Hardware ..... National Lock
Gaskets ..... Bosley
Finish (exterior) ..... Duco
Finish (interior) ..... Porcelain

Voss Ice Machine Works,
280 E. 122nd St., New York, N. Y.
Complete refrigeration systems.
High Side
Compressor—Reciprocating. Drive—Belt, direct.
Method of cooling—Water. Motor—1 to 200 hp.
Condenser—Shell and tube, double pipe and atmosphere.
Refrigerant—Ammonia and carbon dioxide.
Capacities—¼ to 100 tons.

W

Wadsworth Electric Mfg. Co.,
20-34 W. 11th St., Covington, Ky.
Safety switches.

Wagner Electric Corp.,
6400 Plymouth Ave., St. Louis, Mo.
Repulsion-induction motors, squirrel cage motors rubber mounted motors and ball bearing motors.

Walrus Mfg. Co., Decatur, Ill.
Soda fountains.

Waltham Grinding Wheel Co., Waltham, Mass.
Grinding wheels, oil stones.

Ward Refrigerator & Mfg. Co.,
6501 South Alameda St., Los Angeles, Calif.
Domestic and commercial refrigeration cabinets.

Warner & Swasey Co., Cleveland, Ohio.
Turret lathes.

Warner Steel Products Co., Ottawa, Kans.
C. E. Warner, pres.; A. L. Kitselman, vice-pres.; G. L. Warner, gen. mgr. and secy.; W. H. Warner, treas.; G. E. Freeman, sales mgr.; J. W. Cookus, adv. mgr.
Trade name.....**Sure Cold**
Complete refrigeration systems.
High Side
Standard sizes—8. Drive—Belt.
Compressor—Reciprocating. Seal—Cooke Seal.
Motor—1/6 to 1½ hp. Make—Century.
Control—Pressure. Method of cooling—Air.
Condenser—Radiator type.
Refrigerant—Sulphur dioxide.
Capacitiels (ice melting)—25 to 800 lbs.
Low Side
Dry or flooded system. Float valve—Low side.
Method of cooling—Direct.
Freezing trays—2 to 8. Ice cubes—18 to 160.

Warren Tool & Forge Co.,
430 Griswold St., Warren, Ohio.
Small tools.

Waters Filter & Cooler Co.,
148 Chambers St., New York, N. Y.
Purifiers for filtering drinking water.

Warwick Co., A. E.,
Chas. George, Pres.
Insulated shipping containers.
(See Advertisement on Page 45)

Wayne Home Equipment Co.,
102 Glasgow Ave., Ft. Wayne, Ind.
G. A. Berghoff, pres.; W. M. Griffin, vice-pres.; J. A. Berghoff, gen. mgr. and treas.; L. J. Baker, secy. and adv. mgr.; Frank E. Mills, sales mgr.; Frank E. Andrews, chief engr.; F. Vogelgesang, prod. mgr.
Trade name.....**Wayne**
Complete refrigeration systems.
High Side
Standard sizes—5. Drive—Belt.
Compressor—Reciprocating. Seal—Sylphon.
Motor—1/6 to ½ hp. Make—Century.
Control—Pressure and temperature. Also manual cold control. Make—Penn.
Method of cooling—Air.
Condenser—Fin coil, radiator type.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—80 to 300 lbs.
Low Side
Standard sizes—5. Dry system.
Method of cooling—Direct.
Expansion valve—Bellows. Make—American.
Capacities—3½ to 75 cu. ft.
Freezing trays—2 to 6. Ice cubes—56 to 162.
(See Advertisement on Page 36)

Webb & Co., Charles J.,
116 Chestnut St., Philadelphia, Pa.
Trade name.....**Webb Slingabout**
Padded covers and slings for electric refrigerators, tarpaulins, waterproofed canvas and crating felt and dust covers.
(See Advertisement on Page 45)

Webster Mfg. Co.,
1856 Koster Ave., Chicago, Ill.
Conveyors.

Weil Machine Co., 313 Bates St., Detroit, Mich.
Drills, reamers, milling cutters.

Wells & Co., A. H.,
563 Watertown Ave., Waterbury, Conn.
Copper tubing.

Welsbach Company,
Essex & Ellis Sts., Gloucester, N. J.
H. R. Martz, pres.; T. Stites, vice-pres.; R. W. Baker, gen. mgr.; Johns Hopkins, secy.; I. W. Morris, treas.; R. R. Thompson, sales mgr.; F. A. Wegener, chief engr.;
Trade name.....**Welsbach**
Complete refrigeration systems.
High Side
Standard sizes—9. Drive—Belt.
Compressor—Reciprocating. Seal—Sylphon.
Motor—1/6 to 1½ hp. Control—Temperature.
Method of cooling—Air.
Condenser—Fin coil, radiator type.
Refrigerant—Ethyl chloride.
Capacities (ice melting)—125 to 1166 lbs.
Low Side
Standard sizes—10. Dry system.
Method of cooling—Direct or indirect.
Capacities—6 to 40 cu. ft.
Freezing trays—2 to 6. Ice cubes—36 to 126.
Domestic refrigeration cabinets, sizes.....7
Food capacities.....4.75 to 8 cu. ft.
Construction ..... Metal
Insulation ..... Cork
Finish (exterior) ..... Lacquer
Finish (interior) ..... Porcelain

Western Automatic Machine Screw Co.,
Elyria, Ohio.
Special crew machine products, cap and set screws, taper pins, studs and nuts. Cold drawn bar steel.

Westinghouse Electric & Mfg. Co.,
Refrigeration Department, Mansfield, Ohio.
Trade name.....**Westinghouse**
Complete refrigeration systems.
High Side
Compressor—Reciprocating.
Seal—Hermetic.
Method of cooling—Air.
Refrigerant—Sulphur dioxide.
Low Side
Dry system.
Method of cooling—Direct.
Capacities—5½ to 17 cu. ft.
(See Advertisement on Pages 24 and 25)

Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.
Trade name.....**Westinghouse**
Motors and safety switches.

Weston Electrical Instrument Co.,
Newark, N. J.
Indicating instruments.

Whitehead Refrigeration Co., Division of Whitehead & Kales Co.,
3730 Woodward Ave., Detroit, Mich.
Trade name.....**Whitehead**
Complete refrigeration systems.
High Side
Standard sizes—1. Drive—Direct.
Compressor—Reciprocating. Seal—Sylphon.
Motor—1/8 to ¼ hp. Make—Emerson.
Control—Temperature. Make—Mercoid.
Method of cooling—Air. Condenser—Fin coil.
Refrigerant—Methyl chloride.
Capacity (ice melting)—75 lbs.
Low Side
Dry system. Method of cooling—Direct.
Capacities—5 to 10 cu. ft.
Freezing trays—4 to 8. Ice cubes—48 to 96.

Wicander & Co., Inc.,
271 Madison Ave., New York, N. Y.
John H. Dessing, vice-pres.
Trade name.....**Polar**
Corkboard insulation.

Whitlock Coil Pipe Co.,
77 South St., Hartford, Conn.
Coil bending machinery.

Wilder Metal Co., Niles, Mich.
Trade name.....**Wilder**
Metal sheets for brine tanks, cooling units, inside linings, parts and steel tampings.

J. H. Williams & Co., Buffalo, N. Y.
Wrenches, pipe tongs, pipe vises and forgings.

Williams Oil-O-Matic Heating Corp.,
1201 East Bell St., Bloomington, Ill.
Trade name.....**Ice-O-Matic**
Complete refrigeration systems.
High Side
Standard sizes—5. Drive—Belt.
Compressor—Reciprocating
Seal—Bellows. Make—Time-O-Stat.
Motor—1/6 to 1½ hp. Make—Baldor, Leland.
Control—Pressure and temperature. Make—Penn. and Ranco.
Method of cooling—Air. Condenser—Fin coil.
Refrigerant—Methyl chloride.
Capacities (ice melting)—70 to 1200 lbs.
Low Side
Dry or flooded system.
Method of cooling—Direct.
Expansion valve—Bellows. Make—American.
Float valve—Low side. Maker—Fedders.
Capacities—4 to 1200 cu. ft.
Freezing trays—2 to 7. Ice cubes—20 to 216.
(See Advertisement on Page 20)

Wilmington Fibre Specialty Co.,
Wilmington, Dela.
Trade name.....
.....**Wilmington Fibre, Fyberoid, Ohmoid**
Vulcanized fibre in sheets, rods and tubes. and special shapes. Fyberoid, Insulating paper. Laminated Bakelite material.

Winter Brothers Co.,
Wrenthen, Mass., and Detroit, Mich.
Taps, dies.

Winters & Crampton Mfg. Co., Grandville, Mich.
Cabinet hardware.

Wire Brush Co., Springfield, Ohio.
Wire polishing brushes.

Wiremold Co., Hartford, Conn.
Trade name.....**Wiremold, Wireduct, Wireflex**
Conduit, loom, cable fittings and switch boxes.

Wirfs Corporation,
135 S. 17th St., St. Louis, Mo.
Trade name.....**Airtite**
Door gaskets.

Wolverine Porcelain Enameling Co.,
3350 Scotten Ave., Detroit, Mich.
Porcelain enamel steel sheets.

Wolverine Tube Co.,
1411 Central Ave., Detroit, Mich.
Trade name.....**Wolverine**
Seamless copper tubing, coils and bends. Dehydrated copper tubing, condensers, evaporators and integral fin tubing for special purposes.
(See Advertisement on Page 26)

Wood Conversion Co.,
360 N. Michigan Ave., Chicago, Ill.
D. H. Corlette, industrial sales mgr.
Balsam-Wool sealed slabs, Balsam-Wool flexible insulation, Nu-wood insulating board.

Wood & Spencer Co., Cleveland, Ohio.
Small tools.

Worthington Pump & Machinery Corp.,
2 Park Ave., New York, N. Y.
Pump, meters, condensers and compressors.

X

X. L. Refrigerating Co., Inc.,
1834 W. 59th St., Chicago, Ill.
George Hilger, pres. and gen. mgr.; O. T. Hilger, vice-pres.; Ray G. Hilger, secy. and treas.; William H. Motz, chief engr.
Trade name.....**X. L.**
Complete refrigeration systems. Hilger evaporators and air coolers.
High Side
Compressor—Reciprocating. Drive—Belt.
Motor—1/6 to 15 hp. Seal—Oil.
Control—Pressure. Method of cooling—Water.
Condenser—Shell and tube. Water valve—Pressure.
Refrigerant—Methyl chloride.
Capacities (ice melting)—500 lbs to 10 tons.
Low Side
Flooded system. Method of cooling—Direct.
Float valve—Low side.
Freezing trays—2 to 4. Ice cubes—24 to 48.

Y

York Ice Machinery Corp., York, Pa.
Complete refrigeration systems, gas masks.
Trade name.....**York**
High Side
Compressor—Reciprocating. Motor—1 hp. and up.
Method of cooling—Air and water.

Young Brothers, 6500 Mack Ave., Detroit, Mich.
Insulated steel panel oven for drying coils, ovens for baking finishes on parts.

Young Industries, L. A.,
9200 Russell St., Detroit, Mich.
Wire shelving.

Z

Zapon Co., Stamford, Conn.
Lacquer and metal finishes.

Zinc Products, Inc.,
420 Lexington Ave., New York, N. Y.
Zinc accessories.

Zerozone Corp., 927 E. 95th St., Chicago, Ill.
C. E. Jernberg, pres. and gen. mgr.; C. R. Jernberg, vice-pres. and prod. mgr.; O. H. Anderson, secy. and treas.; L. C. Keely, sales mgr.; G. Berg, adv. mgr.; W. E. Bihl, chief engr.; P. A. Lovegren, pur. agt.
Trade name ..... **Zerozone**
Complete refrigeration systems.
High Side
Standard sizes—11. Drive—V-belt.
Compressor—Reciprocating. Seal—Sylphon.
Motor—1/6 to 1½ hp. Make—Century.
Control—Pressure and temperature.
Method of cooling—Air and water.
Water valve—Pressure. Condenser—Radiator.
Refrigerant—Sulphur dioxide.
Capacities (ice melting)—90 to 1330 lbs.
Low Side
Standard sizes—41. Dry or flooded system.
Method of cooling—Direct or indirect.
Expansion valve—Diaphragm.
Float valve—Low side. Make—Fedders, Larkin.
Capacities—5 to 30 cu. ft.

Classified Directory of Refrigeration Products - 1930

Absorption type refrigeration systems:
Crosley Radio Corp.
Electrolux Refrigerator Sales, Inc.
Perfection Stove Co.

Alloys:
American Brass Co.
Mueller Brass Co.

Aluminum products (Screws, castings, sheets, forgings, etc.):
Aluminum Co. of America

Ammonia:
Armour & Co.
Mathieson Alkali Works
National Ammonia Co., Inc.
North American Provision Co.

Ammonia pre-cooler:
Refrigeration Improved Appliance Co.

Ammonia receivers:
Ohio Pipe Bending Machine Co.

Asbestos products:
Johns-Manville, Inc.

Asphalt:
Lewis Asphalt Engrg. Corp.
Pioneer Asphalt Co.

Bakelite products:
Auburn Button Works, Inc.
Kurz Kasch Co.
Phenolic Products Corp.
Reynolds Spring Co.
Rodale Mfg. Co.
Wilmington Fibre Specialty Co.

Bearings (ball):
Fafnir Bearing Co.
General Bearing Co.
Gurney Ball Bearing Division
New Departure Mfg. Co.
S. K. F. Industries
Strom Bearing Co.

Bearing metal:
Mueller Brass Co.

Bearings (roller):
Bower Roller Bearing Co.
S. K. F. Industries

Bellows:
Clifford Mfg. Co.
Fulton Sylphon Co.

Bellows devices:
Bridgeport Brass Co.

Belts:
Continental Rubber Works
Dayton Rubber Mfg. Co.
Gates Rubber Co.
Gilmer Co.
Goodrich Rubber Co.
Iceless Cabinet Accessories
Quality City Rubber Co.
Seiberling Rubber Co.
U. S. Rubber Co.

Beverage coolers:
Aurora Metal Cabinet Works, Inc.
Autodrink Corp.
Hayes Box
Liquid Carbonic Corp.
Liquid Cooler Corp.
S. and S. Products Co.

Beverage coolers (See water coolers)

Bolts (See screw machine products)

Brass castings:
Detroit Brass & Malleable Works
Lincoln Brass Co.

Brass forgings and die pressed parts:
American Brass Co.
Bohn Aluminum & Brass Corp.
Mueller Brass Co.

Brass sheets, rods or strips:
American Brass Co.
Dallas Copper & Brass Co.
Mueller Brass Co.

Brass tubing:
Dallas Copper & Brass Co.
Foster-Wheeler Corp.
Mueller Brass Co.

Brine pumps (See pumps)

Brine stoppers:
Aetna Rubber Co.

Brine tanks:
Haven Mfg. Co.

Bronze sheets, strips and rods:
American Brass Co.

Brushes (Cleaning):
Osborn Mfg. Co.

Cabinet liners:
Metz Products Corp.

Cabinets. (See domestic cabinets, wall coolers, walk-in coolers, display cases, florist cabinets and mortuary cabinets.)

Cadmium plating:
Udylite Process Co.

Calcium chloride:
Columbia Products Co.
Dow Chemical Co.
Solvay Sales Corp.

Carbon dioxide (Solid):
Carbo-Freezer Co., Inc.
Dry Ice Corp. of America
Solid Carbonic Co., Ltd.

Casters:
Bassick Co.
Faultless Caster Co.
Foster-Merriam Co.
Sargent Co.

Castings (See iron, brass, bronze castings)

Celluloid products:
Auburn Button Works, Inc.

Chemicals:
Harshaw Chemical Co.
Roessler & Hasslacher Chemical Co.

Coils and bends:
Ohio Pipe Bending & Machine Co.
Wolverine Tube Co.

Commercial cabinets:
Acorn Opalite Metal Specialties Co.
Allied Store Utilities Co.
Anderson Showcase Mfg. Co.
Banta Refrigerator Co.
Belding-Hall Co.
Bolton & Hay.
Bozman & Bros., Inc., R. H.
Brooks Cabinet Co., Inc.
Buyers Door & Mfg. Co., Ltd.
Campbell Refrigerator Co.
Cincinnati Butchers' Supply Co.
Commercial Refrigerator Mfg. Co.
Crystal Refrigerator Co.
Daemicke Co., Paul J.
Detroit Butchers' Supply Co.
Downing Mfg. Co.
Drayer & Hanson, Inc.
Dry-Kold Refrigerator Co.
Ehrlich & Sons Mfg. Co., H.
Elkins Refrigerator & Fixture Co.
Eureka Refrigerator Co., Ltd.
Federal Asbestos & Cork Insulation Co.
Ford Refrigerator Co., Inc.
Fresno Show Case & Fixture Co.
Friedrich, Ed.
Frigidaire Corp.
Garland Refrigerator Co., Inc.
Gaus Mfg. Co.
General Electric Co.
Gibson Refrigerator Co.
Gloekler Co., Bernard.
Herrel & Sons Co., John.
Herrick Refrigerator & Cold Storage Co.
Hill & Co., Inc., C. V.
Holcomb & Hoke Mfg. Co.
Holderle Bros., Inc.
Howe Scale Co.
Hussmann Refrigerator Division, Allied Store Utilities Co.
Kelvinator Corp.
Koch Butchers' Supply Co.
Leonard Refrigerator Co.
Liver & Co.
Lorillard Refrigerator Co.
McCray Refrigerator Co.
Marinette Show Case Co.
Milburn Refrigerator Co.
Northey Mfg. Co.
Omaha Fixture & Supply Co.
Ottenheimer Bros., Inc.
Polhemus Co., P. B.
Rhinelander Refrigerator Co.
Rodgers Refrigerator Works, Fay.
Ruddy Mfg. Co.
Schmidt Co., C.
Seeger Refrigerator Co.
Sherer-Gillet Co.
Smoot-Holman Co.
Standard Refrigerator Co., Inc.
St. Louis Butchers' & Hotel Supply Co.
Tacoma Metal Refrigerators, Inc.
Ward Refrigerator & Mfg. Co.

Commercial cabinets. (Also see wall coolers, walk-in coolers, display cases, florist cabinets and mortuary cabinets.)

Commercial refrigeration systems:
Absopure Refrigeration Corp.
American Engineering Co.
American Ice Machine Co.
Armstrong Machinery Co., Inc.
Audiffren Refrigerating Machine Co.
Automatic Freezer Corp.
Baker Ice Machine Co.
Bliss Co., E. W.
Brenner Co., Inc., Alphonse.
Brunswick-Kroeschell Co.
Bryant Electric Refrigerator Corp.
California Electric Refrigerators, Inc.
Calvert Electric Refrigeration Co.
Carbondale Machinery Co.
Climax Electrical Refrigeration Co.
Cooke Electric Refrigeration Co.
Copeland Products, Inc.
Creamery Package Mfg. Co.
Crosley Radio Corp.
Cyclops Iron Works.
Dairy Refrigeration Co.
Deer Co., Inc., A. J.
Dole Refrigerating Machine Co.
Electro-Kold Corp.
Excelsior Motor Mfg. & Supply Co.
Frankenberg Refrigeration Co.
Frick Co.
Frigidaire Corp.
Frigid Zone Mfg. Co., Inc.
Frig-o-matic, Ltd.
General Electric Co.
General Refrigeration Co.
Haven Mfg. Co.
Holbrook Mfg. Co.
Howe Ice Machine Co.
Iceberg Mfg. Co.
Icelet Corp.
Icemaster Co.
Isko Co.
Jack Frost Refrigeration, Ltd.
Kelvinator Sales Corp.
Keokuk Refrigerating Co.
Kulair Corp.
Merchant & Evans.
Narragansett Machine Co.
National Electric Refrigeration Corp.
Norge Corp.
Parker Ice Machine Co.
Peerless Ice Machine Co.
Phoenix Ice Machine Co.
Rauf Mfg. Co.
Rice Products, Inc.
Romeson Mfg. Co.
Savage Arms Corp.
Servel Sales, Inc.
Smith Ice Machine Co.
Stevens, Will P.
Stewart Ice Machine Co.
Triumph Ice Machine Co.
Trupar Mfg. Co.
Universal Cooler Co.
Vilter Mfg. Co.
Voss Ice Machine Co.
Warner Steel Products
Wayne Home Equipment Co.
Welsbach Co.
Williams Oil-O-Matic Heating Corp.
X. L. Refrigerating Co., Inc.
York Ice Machinery Corp.
Zerozone Corp.

Compressors:
Romeson Mfg. Co.
Worthington Pump & Machinery Corp.

Condensers:
Bridgeport Brass Co.
Bush Mfg. Co.
Fedders Mfg. Co.
Flintlock Corp.
McCord Radiator & Mfg. Co.
Rome-Turney Radiator Co.
Wolverine Tube Co.

Conduit, electric (See electric devices)

Connecting rods:
Lindell Drop Forge Co.
Superior Machine & Engrg. Co.

Controls (Temperature and pressure):
American Radiator Co.
Apex Regulator Co.
Automatic Reclosing Circuit Breaker Co.
Barostat Co.
Fulton Sylphon Co.
Goodnow & Blake Mfg. Co.
Marsh & Co., J. P.
Mercoid Corp.
Penn Electric Switch Co.
Safety Regulator Co.
Spear Stove & Heating Co., James P.
Time-O-Stat Controls Co.

Conveyors (See material handling)

Coolers. (See wall coolers, walk-in coolers, water coolers, milk coolers and room coolers.)

Cooling units:
American Radiator Co.
Fedders Mfg. Co.
Kulair Corp.
Trupar Mfg. Co.

Cooling coils:
Larkin-Warren Refrigerating Corp.
McCord Radiator & Mfg. Co.
McKean Co.

Copper tubing:
American Brass Co.
Borden Co., A. E.
Chase Brass & Copper Co.
Dallas Brass & Copper Co.
Foster-Wheeler Corp.
French Mfg. Co.
Fretz Brass & Copper Co.
Iceless Cabinet Accessories
Linderme Tube Co.
Mueller Brass Co.
National Copper & Smelting Co.
Roberts Tube Works
Rome Hollow Wire & Tube Co.
Rome-Turney Radiator Co.
United Wire & Supply Corp.
Wells & Co., A. H.
Wolverine Tube Co.

Copper sheets and strips:
National Brass & Copper Co.

Cork and Corkboard (See insulation)

Cranes (See material handling)

Crankshafts:
Lindell Drop Forge Co.
Kropp Forge Co.
Modern Machine Works, Inc.

Defrosting pans (See pans)

Dehydrators:
Fedders Mfg. Co.

Diaphragms:
Detroit Stamping Co.

Dies (See production tools and equipment)

Dishes (Refrigerator):
Fry Glass Co.
Geuder, Paeschke & Frey Co.

Display cases:
Allied Store Utilities Co.
Anderson Showcase Mfg. Co.
Banta Refrigerator Co.
Belding-Hall Co.
Bozman & Bros., R. H.
Campbell Refrigerator Co.
Commercial Refrigerator Mfg. Co.
Crystal Refrigerator Co.
Daemicke Co., Paul J.
Detroit Butchers' Supply Co.
Downing Mfg. Co.
Dry-Kold Refrigerator Co.
Elkins Refrigerator & Fixture Co.
Eureka Refrigerator Co., Ltd.
Friedrich, Ed.
Fresno Show Case & Fixture Co.
Gibson Refrigerator Co.
Gloekler Co., Bernard.
Herrel & Sons Co., John.
Herrick Refrigerator & Cold Storage Co.
Hill & Co., Inc., C. V.
Holcomb & Hoke Mfg. Co.
Howe Scale Co.
Koch Butchers' Supply Co.
Leonard Refrigerator Co.
Lorillard Refrigerator Co.
McCray Refrigerator Co.
Marinette Show Case Co.
Milburn Refrigerator Co.
Northey Mfg. Co.
Ottenheimer Bros., Inc.
Ruddy Mfg. Co.
Schmidt Co., C.
Seeger Refrigerator Co.
Sherer-Gillet Co.
Standard Refrigerator Co., Inc.
St. Louis Butchers' & Hotel Supply Co.

Domestic cabinets:
Alaska Refrigerator Corp.
American Ice Machine Co.
Belding-Hall Co.
Benjamin Electric Mfg. Co.
Bohn Refrigerator Co.
Brooks Cabinet Co., Inc.
Cameo Refrigerator Corp.
Champion Refrigerator Co., Inc.
Crosley Radio Corp.
Crystal Refrigerator Co.
Dillingham Mfg. Co.
Drayer & Hanson, Inc.
Eddy & Sons.
Erie Art Metal Co.
Fabien Refrigerator Co., Ltd.
Federal Asbestos & Cork Insulation Co.
Ford Refrigerator Co., Inc.
Frigidaire Corp.
General Electric Co.
General Steel Wares, Ltd.
Gibson Refrigerator Co.
Gloekler Co., Bernard.
Gurney Refrigerator Co.
Harder Refrigeration Corp.
Hart & Burmeister.
Heintz Mfg. Co.
Heinz & Munschauer.
Herrel & Sons Co., John.
Herrick Refrigerator & Cold Storage Co.
Holmes Products, Inc.
Illinois Refrigerator Sales Co.
J-T Manufacturing Co.
Jewett Refrigerator Co.
Kelvinator Corp.
LaCrosse Refrigerator Corp.
Leonard Refrigerator Co.
Louisville Refrigerator Co.
Mace & Co., Inc., L. H.
McCray Refrigerator Co.
Metz Products Corp.
North Star Refrigerator Co.
Ottenheimer Bros., Inc.
Progress Refrigerator Co.
Puffer-Hubbard Mfg. Co.
Renfrew Refrigerator Co., Ltd.
Rex Mfg. Co.
Rhinelander Refrigerator Co.
Robinson Refrigerator Works.
Ruddy Mfg. Co.
Sanderson-Harold Co., Ltd.
Savory, Inc.
Schmidt Co., C.
Seeger Refrigerator Co.
Servel, Inc.
Steel Craft Mfg. Co.
Success Mfg. Co.
Tacoma Metal Refrigerators, Inc.
Vogt Refrigeration Co.
Ward Refrigerator Co.
Welsbach Co.

Domestic refrigeration systems:
Absopure Refrigeration Corp.
American Ice Machine Co.
Armstrong Machinery Co., Inc.
Audiffren Refrigerating Machine Co.
Automatic Freezer Corp.
Brenner Co., Inc., Alphonse.
Bryant Electric Refrigerator Corp.
California Electric Refrigerators, Inc.
Calvert Electric Refrigeration Co.
Climax Electrical Refrigeration Co.
Cooke Electric Refrigeration Co.
Copeland Products, Inc.
Crosley Radio Corp.
Deer Co., Inc., A. J.
Devon Manufacturing Co.
Electro-Kold Corp.
Electrolux Refrigerator Sales, Inc.
Fessler Mfg. Co.
Frankenberg Refrigeration Co.
Frigidaire Corp.
Frigid Zone Mfg. Co., Inc.
Frig-o-matic, Ltd.
General Electric Co.
General Refrigeration & Mfg. Co.
General Utilities Co.
Hartford Engineering & Machine Co.
Haven Mfg. Co.
Holbrook Mfg. Co.
Holmes Products, Inc.
Houston Icylectric Co.
Iceberg Mfg. Co.
Icelect Corp.
Icemaster Co.
Isko Co.
Jack Frost Refrigeration, Ltd.
Kelvinator Sales Corp.
Keokuk Refrigerating Co.
Kulair Corporation.
Mechana-Kold Corp.
Merchant & Evans.
Metal Saw & Machine Co., Inc.
Mitycold Corp.
Narragansett Machine Co.
National Electric Refrigeration Corp.
Norge Corp.
O'Keefe & Merritt Co.
Parker Ice Machine Co.
Perfection Stove Co.
Rauf Mfg. Co.
Rice Products, Inc.
Romeson Mfg. Co.
Servel Sales, Inc.
Trupar Mfg. Co.
Universal Cooler Corp.
Warner Steel Products.
Wayne Home Equipment Co.
Welsbach Co.
Westinghouse Electric & Mfg. Co.
Whitehead Refrigeration Co.
Williams Oil-O-Matic Heating Corp.
Zerozone Corp.

Door gaskets (See gaskets)

Doors (Cooler, freezer, service, etc.):
Blazek Cold Storage Door Co.
Victor Products Corp.

Drills (See production tools)

Drinking fountains:
Allen Filter Co.
Liquid Cooler Corp.
Taylor Co., Halsey

Drop forgings:
Kropp Forge Co.

Electrical devices and supplies (Switches, overload breakers, attachments, plugs, conduit, etc.):
Allen-Bradley Co.
American Electric Switch Corp.
American Insulated Wire & Cable Co.
American Metal Hose Co.
Appleton Electric Co.
Automatic Reclosing Circuit Breaker Co.
Beaver Mfg. Co.
Belden Mfg. Co.
Colts Patent Fire Arms Mfg. Co.
Connecticut Electric Mfg. Co.
Crouse-Hinds Co.
Cutler-Hammer, Inc.
General Electric Co.
McNaughton & McKay
National Electric Products Corp.
Rodale Mfg. Co.
Rome Wire Co.
Sherman Mfg. Co.
Square D Company
States Co., The
Tork Clocks, Inc.
Trumbull Electric Mfg. Co.
Wadsworth Electric Mfg. Co.
Westinghouse Electric Mfg. Co.
Wiremold Co.

Electric motors (See motors)

Ethyl Chloride:
Dow Chemical Co.
Roessler and Hasslacher Chemical Co.

Evaporators:
Cleveland Evaporator Co.
Fedders Mfg. Co.
Haven Mfg. Co.
Mullins Mfg. Corp.
Wolverine Tube Co.
X. L. Refrigerating Co., Inc.

Expansion valves (See valves)

Fans (Compressor):
Cope-Swift Co., Inc.
Detroit Metal Specialty Corp.
Quality Mfg. Co.

Faucets (Water cooler):
Cordley & Hayes

Felt:
Rhodes & Co.
Webb Co., Charles J.

Fibre products:
Continental-Diamond Fibre Co.

Filters:
Fedders Mfg. Co.
Filtrine Mfg. Co.
Waters Filter & Cooler Co.

Finishing materials (Lacquers, enamels, paints, varnishes, etc.):
Acme White Lead & Color Works
Berry Bros.
Boydell Bros.
Bradley-Hurtz Co.
DeVilbiss Co.
Du Pont de Nemours & Co., E. I.
Durable Products Co.
Egyptian Lacquer Mfg. Co., Inc.
Ferro Enamel & Supply Co.
Maas & Waldstein Co.
National Lead Co.
Porcelain Enamel & Mfg. Co.
Roessler and Hasslacher Chemical Co.
Sherwin-Williams Co.
Truscon Laboratories
Zapon Co.

Fittings:
American Brass Co.
Bohn Aluminum & Brass Corp.
Borden Co., A. E.
Iceless Cabinet Accessories
Imperial Brass Co.
Kerotest Mfg. Co.
McLaren Screw Products Co.
Mueller Brass Co.
Mueller Co.
Vogt Machine Co., Henry

Flaring tools (See service tools)

Floats:
Fedders Mfg. Co.
Goodnow & Blake Mfg. Co.
Superior Seal & Stamp Co.

Float valves (See valves)

Florist cabinets:
Campbell Refrigerator Co.
Dry-Kold Refrigerator Co.
Elkins Refrigerator & Fixture Co.
Friedrich, Ed.
Milburn Refrigerator Co.

Flywheels:
Detroit Metal Specialty Corp.

Freezer cases. (See display cases.)

Freezing units:
Fedders Mfg. Co.
Kulair Corp.

Furnaces (See production tools and equipment)

Gaskets:
Bosley Co., D. W.
Jarrow Products Corp.
Miller Rubber Co. of New York
Rider, P. L.
Victor Products Corp.
Wirfs Corporation

Gaskets (machine):
Chicago-Wilcox Corp.
Victor Mfg. & Gasket Corp.

Gasket material:
Du Pont de Nemours & Co., E. I.

Gas masks:
Pulmosan Safety Equipment Co.

Gauges:
Marsh Co., J. P.
Mercoid Corp.
U. S. Gauge Co.

Gliders (cabinet):
Mattatuck Mfg. Co.

Grinders (See production tools)

Guards (See wire guards)

Hardware (Locks, hinges, fasteners, etc.):
American Brass Co.
Arcade Mfg. Co.
Bohn Aluminum & Brass Corp.
Dent Hardware Co.
Dura Co.
Grand Rapids Brass Co.
Keeler Brass Co.
Sargent Co.
Schmidgall & Son, Fred
Scovill Mfg. Co.
Stanley Works
Tri-Clover Machine Co.
Victor Products Corp.
Winters & Crampton Mfg. Co.

Hoists (See material handling)

Ice cream cabinet accessories:
Aetna Rubber Co.
Refrigerating Equipment Co.

Ice cream cabinets:
Absopure Refrigeration Corp.
American Car & Foundry Co.
Aurora Metal Cabinet Works, Inc.
Bolton & Hay
Hale & Kilburn Co.
Kelvinator Corp.
Loeber Co., H. G.
Manning Mfg. Co.
Motors Metal & Mfg. Co.
Nelson Mfg. Co., C.
Refrigerating Equipment Co.
Servel Sales, Inc.
Universal Cooler Corp.

Ice cream freezer and cabinet:
Raiche Mfg. Co.
Taylor Freezer Corp.

Ice cube freezing trays:
Lima Sheet Metal Products Co.
Kurz Kasch Co.

Ice freezer units:
Schmidt Co., C.

Ice trays (Rubber):
Dwelley, Inc., G. M.

Imitation foods:
Imitation Food Products Co.
Trutulife Wax Products Co.

Industrial refrigeration systems:
American Engineering Co.
Armstrong Machinery Co., Inc.
Baker Ice Machine Co.
Bliss Co., E. W.
Brunswick-Kroeschell Co.
Cyclops Iron Works.
Detroit Ice Machinery Co.
Frick Co.
General Refrigeration Co.
Howe Ice Machine Co.
Phoenix Ice Machine Co.
Stevens, Will P.
Triumph Ice Machine Co.
Vilter Mfg. Co.
Voss Ice Machine Co.
X. L. Refrigerating Co., Inc.
York Ice Machinery Co.

Installation tools (See service)

Insulation:
Armstrong Cork & Insulation Co.
Balsa Wood Co.
Cabot, Inc., Samuel
Celotex Co.
Chicago Mill & Lumber Corp.
Cork Import Co.
Cork Insulating, Inc.
Dry-Zero Corp.
Federal Asbestos & Cork Insulation Co.
Insulation Cork Co.
Insulite Co.
Luse Stevenson Co.
MacAndrews & Forbes Co.
Mortex Co.
Mundet & Son, L.
Pennrich & Co., Inc.
Pure Cork Products Co.
Thermwool Products Co.
Union Bag & Fibre Corp.
Union Fibre Sales Co.
United Cork Companies
U. S. Mineral Wool Co.
Wicander & Co., Inc.
Wilmington Fibre Specialty Co.
Wood Conversion Co.

Iron sheets (See metal sheets)

Iron castings:
Detroit Brass & Malleable Works
Flint Foundry Co.
Little Bros. Foundry Co.
Gale Mfg. Co.

Lacquers (See finishing materials)

Lathes (See production tools)

Lead tubing:
National Lead Co.

Explanatory

In using this directory, first look up the product in which you are interested. Under it will be the names of companies engaged in its manufacture. The address, a brief summary of the products made, trade names and principal officers of each manufacturer listed will be found in the manufacturers' directory, Pages 35-43.

Liquid receivers:
Detroit Metal Specialty Corp.
Fedders Mfg. Co.
Liberty Welding & Mfg. Co.
Bridgeport Brass Co.
Commonwealth Brass Corp.
Henry Valve Co.

Locks (See hardware)

Luncheonette equipment:
Aurora Metal Cabinet Works, Inc.
Carter, H. G.

Material handling equipment (Cranes, hoists, conveyors, etc.):
Cleveland Electric Tramrail
Detroit Hoist Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link Belt Co.
Lowerator Mfg. Co.
Olson & Co., S.
Pitcher Co., H. L.
Reading Chain & Block Corp.
Shepard Niles Crane & Hoist Corp.
Standard Conveyor Co.
Webster Mfg. Co.

Metal sheets for cabinets, etc.:
Allegheny Steel Co.
American Rolling Mill Co.
Central Alloy Steel Corp.
Motors Metal & Mfg. Co.
Superior Sheet Steel Co.
Wilder Metal Co.

Metallic packing:
France Packing Co.

Methyl chloride:
Roessler & Hasslacher Chemical Co.

Milk coolers:
Chester Dairy Supply Co.
Domestic Utilities
Esco Cabinet Co.
General Electric Co.
Kelvinator Corp.
Manning Mfg. Co.
Nagle Sheet Iron Works
Reid Dairy Supply Co.
Valerius Corp.
Victor Products Corp.

Milling machines (See production tool)

Monel Metal:
International Nickel Co., Inc.

Mortuary cabinets:
Campbell Refrigerator Co.

Motor bases:
Motors Metal & Mfg. Co.

Motors:
Baldor Electric Co.
Century Electric Co.
Delco Products Corp.
Emerson Electric Co.
General Electric Co.
Leland Electric Co.
Master Electric Co.
Ohio Electric & Control Co.
Roth Brothers & Co.
Wagner Electric Corp.
Westinghouse Electric Mfg. Co.

Name plates:
Crowe Name Plate Co.
General Etching & Mfg. Co.

Nickel:
International Nickel Co., Inc.

Nuts (See screw machine products)

Oils, compressor:
Houghton Co., E. F.
Schlieman Companies
Sinclair Refining Co.
Standard Oil Co.
Sun Oil Co.

Packing:
Continental Rubber Works
Vellumoid Co.

Paints (See finishing materials)

Paint sprayers (See production tools)

Pans (Defrosting):
Geuder, Paechke & Frey Co.

Patent Attorney:
Van Deventer, H. R.

Phenolite products:
National Vulcanized Fibre Co.

Pipe headers:
Ohio Pipe Bending & Machine Co.

Piston fittings:
Spencer Smith Machine Co.

Piston rings:
American Hammered Piston Ring Co.
Steel or Bronze Piston Ring Co.

Pistons:
Quality Mfg. Co.
Spencer Smith Machine Co.

Porcelain cement:
Tuttle's Tite-On Cement Co.

Porcelain finishing materials (See finishing materials)

Porcelain sheets and products:
Benjamin Electric Mfg. Co.
Emerson-Brantingham Corp.
Metz Products Corp.
Mullins Mfg. Corp.
Savory, Inc.
Wolverine Porcelain Enameling Co.

Pressure controls (See controls)

Production tools and equipment (Drill presses, reamers, lathes, welders, grinders, air compressors, furnaces, saws, drills, dies, chucks, clamps, etc.):
Acme Detroit Saw Corp.
Aeroil Burner Co., Inc.
Almond Mfg. Co.
American Diamond Tool Co.
American Emery Wheel Co.
Anchor Brass Foundries
Armstrong Brothers Tool Co.
Avey Drilling Machine Co.
Baker Bros.
Batavia Clamp Co.
Binks Spray Equipment Co.
Black Bros., Inc.
Blakeslee & Co., G. S.
Bridgeport Safety Emery Wheel Co., Inc.
Brown & Sharpe Mfg. Co.
Buckeye Twist Drill Co.
Bullard Co.
Bury Compressor Co.
Century Saw & Tool Works
Chicago Flexible Shaft Co.
Chicago Pneumatic Tool Co.
Cincinnati Milling Machine Co.
Cincinnati Grinders, Inc.
City Machine & Tool Works
Consolidated Machine Tool Co.
Cramp Mfg. Co.
Crawford Oven Co.
Cushman Chuck Co.
Cyclops Steel Co.
Detroit Edge Tool Works, Inc.
Eberhard Mfg. Co.
Erie Drop Forge Co.
Eureka Pneumatic Spray Co.
Federal Machine & Welder Co.
Ferrachute Machine Co.
Ferro Enamel & Supply Co.
Gardner Machine Co.
Gardener Tap & Die Co.
Giddings & Lewis Machine Tool Co.
Goodell-Pratt Co.
Grand Rapids Blow Pipe Co.
Greenfield Tap & Die Co.
Haberkorn & Wood
Hanson Machine Co.
Hanson & Van Winkle Co.
Hanson & Whitney Machine Co.
Henry & Wright Machine Co.
Holcomb Steel Co.
Hutto Engrg. Co., Inc.
Independent Pneumatic Co.
Ingersoll Machine Co.
Ingersoll Rand Co.
Landis Tool Co.
Le Blond Machine Tool Co.
Leland & Gifford Co.
Leurs, Inc.
Manufacturers Equipment Co.
Markwell Mfg. Co.
McCrosky Tool Corp.
McMullen Tool & Supply Co.
Melliser-Hayward Co.
Michigan Tool Co.
Midwest Tool & Mfg. Co.
Miller Falls Co.
Mitchell Pattern Works
Monarch Machine Tool Co.
Morand Machinery Co., D. E.
Motor Tool Specialty Co.
National Broach Co.
Niagara Machine & Tool Co.
Norton Co.
Oxweld Acetylene Co.
Peck, Stow & Wilcox Co.
Powell Co., William
Pratt & Whitney Co.
Rockwell Co., W. S.
Simonds Saw & Steel Co.
Starrett Co., L. S.
Star Tool & Die Co.
St. Louis Pipe Bending Co.
Stow Mfg. Co.
Sullivan Machinery Co.
Surface Combustion Co.
Tacony Steel Co.
Taylor-Winfield Corp.
Thomson-Gibb Electric Welding Co.
Toledo Machine & Tool Co.
Treadwell Tool Co.
Van Dorn Electric Tool Co.
Waltham Grinding Wheel Co.
Warner & Swasey Co.
Warren Tool & Forge Co.
Weil Machine Co.
Whitlock Coil Pipe Co.
Whitney Metal Tool Co.
Winters Brothers Co.
Wire Brush Co.
Wood & Spencer Co.
Young Brothers

Pulleys (Belt):
Cope-Swift Co., Inc.
Quality Mfg. Co.

Pumps (Brine, water, etc.):
Oberdorfer Brass Co., M. L.
Romeson Mfg. Co.
Stark Pump Co.
Tri-Clover Machine Co.
Worthington Pump & Machinery Corp.

Reamers (See production tools)

Recording instruments (See testing instruments)

Refrigerants (See ammonia, ethyl chloride, methyl chloride, sulphur dioxide, etc.)

Refrigeration systems. (See domestic refrigeration systems, commercial refrigeration systems, industrial refrigeration systems, and absorption type refrigeration systems.)

Refrigerator covers and pads:
Fulton Bag & Cotton Mills
Lansing Sales Co.
New Haven Pad & Quilt Co.
Webb Co., Charles J.

Refrigerator fronts:
Victor Products Corp.
Refrigerators (See cabinets).

Refrigerators. (See cabinets.)

Related merchandise:
Dwelley, Inc., G. M.
Fry Glass Co.
Geuder, Paeschke & Frey Co.
Silverice, Inc.
Sparklets, Inc.

Respirators:
Pulmosan Safety Equipment Corp.

Restaurant coolers:
Acorn Opalite Metal Specialties Co.
Aurora Metal Cabinet Works, Inc.

Room cooler:
Frigidaire Corp.

Rubber products (Stoppers, crutch tips, etc.):
Dayton Rubber Mfg. Co.
Gates Rubber Co.
Goodrich Rubber Co.
Iceless Cabinet Accessories
Jarrow Products Corp.
Miller Rubber Co. of New York
Ohio Rubber Co.
Seiberling Rubber Co.
U. S. Rubber Co.

Rubber ice cube trays:
Dwelley, Inc., G. M.

Rust proofing materials:
Berry Bros.
Parker Rust Proof Co.

Saws (See production tools)

Screens (metal):
Superior Seal & Stamp Co.

Screw machine products (Cap screws, bolts, nuts, screws, etc.):
Ajax Bolt & Screw Co.
Allied Products Corp.
American Nut Co.
Automatic Products Co.
Cleveland Cap Screw Co.
Commonwealth Brass Corp.
Conn Perry Mfg. Co.
Detroit Nut Co., Inc.
Detroit Screw Works
Hoff & Forney
International Screw Co.
Ireland & Matthews Mfg.
May Screw Products
Olsen Mfg. Co.
Parker Harper Mfg. Co.
Pheoll Mfg. Co.
Progressive Mfg. Co.
Scovill Mfg. Co.
Western Automatic Machine Screw Co.

Seals (See bellows also):
Clifford Mfg. Co.
Colts Patent Fire Arms Mfg. Co.
Cooke Seal Ring

Service tools (Flaring tools, tube benders, wrenches, etc.):
Buhl Stamping Co.
Imperial Brass Co.
Kant Slip Plier & Tool Co.
Markwell Mfg. Co.
Motor Tool Specialty Co.
Smillie & Co., C. M.
Snap-On Wrench Co.
Williams & Co., J. H.

Shells (Copper and brass):
Bridgeport Brass Co.

Shelving:
Collis Co.
Union Steel Wire Co.
Victor Products Corp.
Young Industries

Shipping crates and containers:
Atlas Plywood Corp.
Cleveland Container Co.
Continental Can Co.
Warwick Co., A. E.

Silver solder, sheet and wire:
Handy & Harmon

Soda fountains:
Aurora Metal Cabinet Works, Inc.
Bastian-Blessing Co.
Carter, H. G.
Holderle Bros., Inc.,
Knight Co., Stanley
Liquid Carbonic Corp.
Pick Co., Albert
Russ Mfg. Co.
Spalt & Sons, George
United-American Soda Fountain Co.
Valerius Corp.
Walrus Mfg. Co.

Soldering supplies:
American Solder & Flux Co.
Handy & Harmon
United Wire & Supply Co.

Springs (Coiled and flat):
Peterson Spring Co.

Stampings:
Buhl Stamping Co.
Detroit Stamping Co.
General Etching & Mfg. Co.
Geuder, Paeschke & Frey Co.
Hale & Kilburn Co.
Harry Bros. Mfg. Co.
Motors Metal & Mfg. Co.
Sargent Co.
Wilder Metal Co.

Steel panels for cabinets:
Motors Metal & Mfg. Co.

Steel sheets (See metal sheets)

Steel strapping for shipping containers:
Signode Steel Strapping Co.

Steel tubing:
Allegheny Steel Co.
Service Steel Co.

Strainers:
Apex Regulator Co.
Fedders Mfg. Co.

Studs (See screw machine products)

Stuffing boxes:
Clifford Mfg. Co.

Suction screens:
Fedders Mfg. Co.

Sulphur dioxide:
Ansul Chemical Co.
Calco Chemical Co.
Virginia Smelting Co.

Switches (See electric devices)

Taper pins (See screw machine products)

Temperature controls (See controls)

Testing instruments (Thermometers, recorders, etc.):
Brown Instrument Co.
Carroll Glass Instrument Co.
Foxboro Co.
Iceless Cabinet Accessories
Loveday Co., W. G.
Moto Meter Gauge & Equipment Corp.
Philadelphia Thermometer Co.
Scientific Instrument Co.
Service Recorder Co.
Standard Thermometer Co.
Tagliabue Mfg. Co.
Taylor Instrument Companies
Weston Electric Instrument Co.

Tools (See production tools)

Trimming (Corner pieces, angle irons):
International Nickel Co., Inc.
Lees Co., John

Tube benders (See service tools)

Tube bends:
Rome Radiator & Mfg. Co.
United Tube & Die Co.

Tubing (See copper and steel tubing)

Valves:
American Radiator Co.
Apex Regulator Co.
Automatic Refrigerating Co., Inc.
Barostat Co.
Bohn Aluminum & Brass Corp.
Cash Valve Mfg. Co.
Clifford Mfg. Co.
Duriron Co., Inc.
Fedders Mfg. Co.
Henry Valve Co.
Imperial Brass Co.
Kerotest Mfg. Co.
Mueller Brass Co.
Vogt Machine Co., Henry

Valve stems:
Hoff & Forney

Walk-in coolers:
Anderson Showcase Mfg. Co.
Banta Refrigerator Co.
Belding-Hall Co.
Bozman Bros., Inc., R. H.
Campbell Refrigerator Co.
Daemicke Co., Paul J.
Downing Mfg. Co.
Dry-Kold Refrigerator Co.
Elkins Refrigerator & Fixture Co.
Eureka Refrigerator Co., Ltd.
Fabien Refrigerator Co., Ltd., C. P.
Fresno Show Case & Fixture Co.
Friedrich, Ed.
Gibson Refrigerator Co.
Herrel & Sons Co., John.
Howe Scale Co.
Koch Butchers' Supply Co.
Lorillard Refrigerator Co.
McCray Refrigerator Co.
Milburn Refrigerator Co.
Northey Mfg. Co.
Ottenheimer Bros., Inc.
Schmidt Co., C.
Seeger Refrigerator Co.
Standard Refrigerator Co.
St. Louis Butchers' & Hotel Supply Co.

Wall coolers:
Anderson Showcase Mfg. Co.
Banta Refrigerator Co.
Belding-Hall Co.
Bozman Bros., Inc., R. H.
Campbell Refrigerator Co.
Crystal Refrigerator Co.
Daemicke Co., Paul J.
Downing Mfg. Co.
Dry-Kold Refrigerator Co.
Ehrlich & Sons Mfg. Co., H.
Elkins Refrigerator & Fixture Co.
Eureka Refrigerator Co., Ltd.
Fresno Show Case & Fixture Co.
Friedrich, Ed.
Gibson Refrigerator Co.
Gloekler Co., Bernard.
Herrel & Sons Co., John.
Herrick Refrigerator & Cold Storage Co.
Howe Scale Co.
Koch Butchers' Supply Co.
Leonard Refrigerator Co.
Lorillard Refrigerator Co.
McCray Refrigerator Co.
Milburn Refrigerator Co.
Northey Mfg. Co.
Ottenheimer Bros., Inc.
Ruddy Mfg. Co.
Schmidt Co., C.
Seeger Refrigerator Co.
Sherer-Gillet Co.
Standard Refrigerator Co., Inc.
St. Louis Butchers' & Hotel Supply Co.

Washers (Lock):
Shakeproof Lockwasher Co.

Water cooler cabinets:
Allen Filter Co.

Water coolers:
Absopure Refrigeration Corp.
Arctic Aire Co.
Copeland Products, Inc.
Cordley & Hayes
Day & Night Water Heater Co., Ltd.
Dyer Electric Cooler Corp.
Ebinger Sanitary Mfg. Co., D. A.
Filtrine Mfg. Co.
Frantz Refrigeration Co.
Frigidaire Corp.
General Electric Co.
Iceberg Mfg. Co.
Kelvinator Corp.
Liquid Cooler Corp.
Servel Sales, Inc.
Spear Stove & Heating Co., James

Water cooling equipment for refrigerating machines:
Treadwell Co., Inc., M. H.

Water cooling low sides:
Day & Night Water Heater Co., Ltd.
Liquid Cooler Corp.

Wax paper:
Kalamazoo Vegetable Parchment Co.

Welded frames:
Liberty Welding & Mfg. Co.

Welding machines (See production tools)
Swift Electric Welding Co.

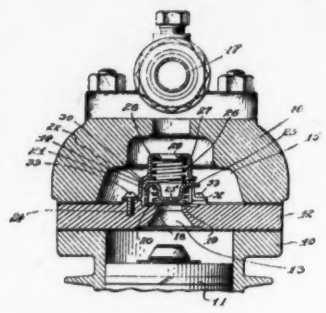
Wire frames and guards:
Page Steel & Wire Co.

Woodruff keys (See screw machine products)

Wrenches (See service tools)

Zinc accessories:
Zinc Products, Inc.

NEWLY ISSUED PATENTS IN T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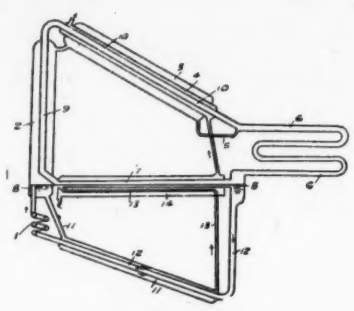
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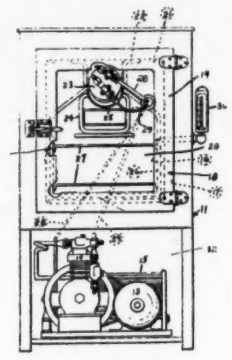
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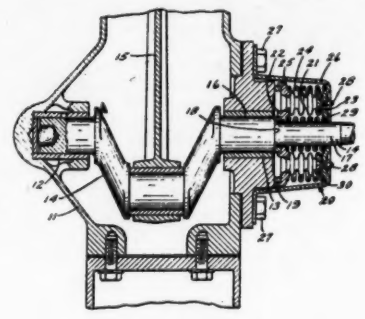
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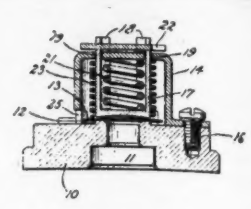
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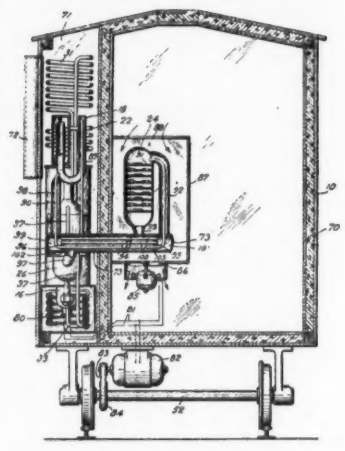
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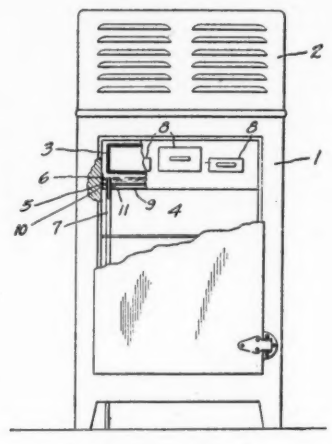
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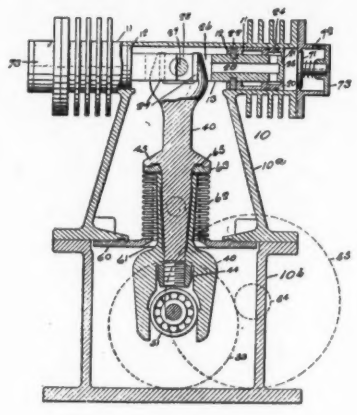
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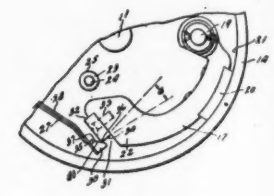
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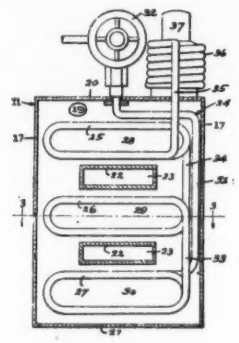
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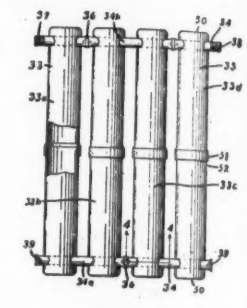

1,738,126

ISSUED NOVEMBER 26

1,736,773—REFRIGERATING SYSTEM. Max Alex, Davenport, Iowa. Filed Oct. 1, 1926. Serial No. 138,902. 7 Claims. (Cl. 62—5.)

1. A refrigerating system, comprising a combined generator and absorbing chamber for containing a liquid carrying a refrigerant, means for periodically heating said liquid to thereby gasify the refrigerant, a combined condenser and cooling tank, means for conducting the gasified refrigerant from said chamber to said tank and condensing the refrigerant, means for cooling said liquid after it has been heated to cause it to absorb the refrigerant, a conduit leading from the upper portion of said tank to said chamber to return the refrigerant to said chamber, and means for automatically returning the liquid carried with said refrigerant from said chamber to said tank back to said chamber when the combined volume of liquid and condensed refrigerant in said tank exceeds a predetermined volume said means receiving liquid only from the lower portion of said tank.

1,736,774—REFRIGERATING SYSTEM. Max Alex, Davenport, Iowa. Filed Oct. 1, 1926. Serial No. 138,903. 2 Claims. (Cl. 62—120.)

1. In a device of the character described, a casing having a water supply chamber therein, a combined cooling and condensing chamber in said water supply chamber, a generator and absorption chamber adjacent said supply chamber and having communication with said cooling chamber whereby the refrigerant may circulate between the generator chamber and cooling chamber, heating means for heating said generator chamber, a cooling pipe extending through said generator chamber, a water supply means leading into and an overflow leading from said supply chamber, control means for starting said heating means and causing the supply of water to said supply tank when the temperature in said supply tank rises to a certain value, and control means for stopping said heating and water supply means and causing the supply of cooling water to said cooling pipe, when the temperature of said generator chamber increases to a certain value, said last named control means responding to a temperature of said water supply chamber to cut off the supply of cooling water to said cooling pipe when the temperature in the said water supply chamber falls below a certain value.

1,736,788—PRECOOLER FOR REFRIGERATOR CARS. James D. Huston, Imperial, Calif. Filed Aug. 5, 1926. Serial No. 127,268. 8 Claims. (Cl. 62—24.)

1,736,839—APPARATUS FOR STERILIZING AIR. Joseph F. Schiller and Walter W. Wescott, Philadelphia, Pa., assignors of two-thirds to said Joseph F. Schiller and one-third to said Walter W. Wescott. Filed Jan. 8, 1923. Serial No. 611,542. 3 Claims. (Cl. 63—135.)

1,736,871—REFRIGERATION. Sigurd Mattias Bäckström, Stockholm, Sweden, assignor to Electrolux Servel Corporation, New York, N. Y., a Corporation of Delaware. Filed May 4, 1927, Serial No. 188,652, and in Sweden May 22, 1926. 10 Claims. (Cl. 62—117.)

1. A refrigerator car having wells forming a major cooling space and a lateral space, a vapor generator in said lateral space, a heater for said generator, elements connected to said generator forming a refrigerating system including an evaporator in said major space and a heat rejecting element in said lateral space, louvres for circulating air through said lateral space, and means responsive to the speed of the vehicle for controlling the heating effect of said heater.

1,736,884—REFRIGERATOR. George W. Mason, Detroit, Mich., assignor to Copeland Products, Inc., Detroit, Mich., a Corporation of Michigan. Filed Aug. 12, 1926. Serial No. 128,734. 2 Claims. (Cl. 62—95.)

1. In a refrigerating cabinet, an expansion element, a container below said element adapted to receive drippings from said element, a second container below the first mentioned container adapted to receive drippings therefrom, and means for limiting the level of said drippings in the first mentioned container to a point between the top and bottom thereof and for draining the second mentioned container.

1,736,973—PUMP FOR REFRIGERATION SYSTEMS. Jesse G. King, Dayton, Ohio, assignor, by mesne assignments, to General Motors Research Corporation, Dayton, Ohio, a Corporation of Delaware. Filed July 19, 1920. Serial No. 397,519. 23 Claims. (Cl. 30—85.)

1. A compressor having a casing, a walking beam disposed within said casing, a bellows surrounding said beam near the center thereof, one end of the said bellows being hermetically sealed to the casing and the opposite end being similarly sealed to the said walking beam, a member extending outward from the said walking beam where said bellows is sealed thereto, arms extending laterally from said member toward the longitudinal center of said bellows and bearings for said arms at the approximate longitudinal center of said bellows.

1,736,974—PUMP FOR REFRIGERATION SYSTEMS. Jesse G. King, Dayton, Ohio, assignor, by mesne assignments, to General Motors Research Corporation, Dayton, Ohio, a Corporation of Delaware. Filed Aug. 3, 1920. Serial No. 400,894. 5 Claims. (Cl. 74—14.)

1. A power transmitting device comprising in combination a wall; and means for transmitting power through the wall, including a power transmitting member having a nutating portion, and a metal bellows sealed to the wall and connected to said nutating portion, the center of nutation of said nutating portion being substantially midway between the normal positions of the end planes of the bellows.

1,737,083—REFRIGERATING OR COOLING APPARATUS. Hans Haager, Bad Hall, Austria. Filed Aug. 26, 1927, Serial No. 215,660, and in Austria Sept. 3, 1926. 4 Claims. (Cl. 62—120.)

1. Refrigerating or cooling apparatus, comprising in combination an upright vessel containing a refrigerating medium, a coil shaped upright condenser-evaporator, disposed underneath the said vessel and substantially coaxially to the same; a tubular connection between the said refrigerating vessel and the said condenser-evaporator coil; and means for connecting the refrigerator vessel to a source of electric heating current.

1,737,426—REFRIGERATING MACHINE OF THE ABSORPTION TYPE. Guido Maiuri and Raoul Felice Bossini, London, England. Filed Apr. 25, 1929, Serial No. 358,091, and in Great Britain Sept. 29, 1927. 2 Claims. (Cl. 62—119.5.)

1. An absorption refrigerating machine of the kind in which evaporation and absorption of the refrigerant take place into and from an inert gas, in which the inert gas is sealed in the machine at atmospheric pressure, comprising a generator, a condenser, an evaporator, an absorber and conduits therebetween, having the volumetric capacity of said evaporator, absorber and connecting conduits in which the inert gas circulates of less capacity than that of the vapor space in the generator and condenser.

1,737,428—PRESSURE VALVE. Nathan L. Mercur, McKeesport, Pa., assignor to C. Howard Hook, Pittsburgh, Pa. Filed Apr. 4, 1928. Serial No. 267,281. 3 Claims. (Cl. 50—23.)

ISSUED DECEMBER 3

1,737,585—THERMOSTATIC VALVE. Edward E. Gold, New York, N. Y., assignor to Gold Car Heating & Lighting Company, Brooklyn, N. Y., a Corporation of New York. Filed July 23, 1927. Serial No. 207,967. 7 Claims. (Cl. 236—99.)

1,737,627—REFRIGERATOR - CAR - DOOR - OPERATING MECHANISM. Tandy R. Wear, Colton, Calif., assignor to W. H. Miner, Inc., Chicago, Ill., a Corporation of Delaware. Filed Mar. 15, 1926. Serial No. 94,952. 5 Claims. (Cl. 268—72.)

1,737,706—VALVE. William D. Collins, Evansville, Ind., assignor to Servel, Inc., New York, N. Y., a Corporation of Delaware. Filed May 4, 1928. Serial No. 275,134. 8 Claims. (Cl. 251—119.)

4. A valve structure having a port and a seat therefor, a valve element adapted to close said seat, a stationary element and seat, a cup member over said valve element, a relatively heavy spring said element, a relatively heavy spring extending between said outer member and said cup member, a relatively light spring extending between said outer member and said valve element, said springs being arranged beside each other, and means for limiting downward movement of the cup member.

1,737,710—COMPRESSOR VALVE. Frederick R. Erbach, Detroit, Mich., assignor to Kelvinator Corporation, Detroit, Mich., a Corporation of Michigan. Filed June 17, 1927. Serial No. 199,442. 10 Claims. (Cl. 251—119.)

1. In a discharging valve, a valve seat, an independently reciprocable valve closing member adapted to engage said seat, a spring member adapted to engage said valve closing member, a reciprocable housing for said spring member, and means for preventing rotary movement of said housing.

1,737,776—MECHANICAL REFRIGERATION. Charles C. Spreen, Detroit, Mich., assignor to Kelvinator Corporation, Detroit, Mich., a Corporation of Michigan. Filed Mar. 8, 1926. Serial No. 93,005. 12 Claims. (Cl. 62—95.)

12. In a mechanical refrigerating system, a brine tank provided with a recess extending through said tank between opposite lateral faces thereof, said recess being formed to receive a receptacle for the production of artificial ice, and to divide said brine tank vertically into two spaces; and a refrigerant expansion unit disposed within said tank and comprising two coils, each extending substantially the entire length of and disposed in one of said spaces.

1,737,777—JOURNAL - BEARING SEAL. Charles C. Spreen, Detroit, Mich. Filed Dec. 30, 1926. Serial No. 157,940. 6 Claims. (Cl. 286—11.)

1. In a journal bearing seal, the combination of a casing provided with a shaft aperture, and with a seat encircling the axis of said aperture, a shaft passing through said aperture and provided with a seat, and a seal for said aperture comprising a resilient tubular bellows structure resiliently sealed at one end to said casing seat and resiliently and rotatably sealed at the other end to said shaft seat, the other of said sealed diaphragm ends being unattached relative to said casing seat.

1,737,778—COOLING UNIT FOR REFRIGERATORS. Charles C. Spreen, Detroit, Mich., assignor to Kelvinator Corporation, Detroit, Mich., a Corporation of Michigan. Filed Apr. 11, 1927. Serial No. 182,709. 9 Claims. (Cl. 62—95.)

9. In a refrigerating apparatus, a cooling unit including a receptacle for containing liquid refrigerant, and a plurality of pipe loops in communication with said receptacle below the level of liquid refrigerant therein, said pipe loops being arranged to define a freezing zone adjacent said receptacle and a food storage zone exteriorly of said freezing zone.

1,737,825—CLUTCH FOR REFRIGERATORS. Herbert L. Brump and Frederick Bauch, Dayton, Ohio, assignors to The Day-Fan Electric Company, Dayton, Ohio, a Corporation of Ohio. Filed Sept. 30, 1927. Serial No. 223,095. 5 Claims. (Cl. 192—105.)

2. A clutch comprising a rotatable driving member, a weight member mounted on said driving member so as to move outwardly under the action of centrifugal force, said weight member having a friction clutch surface, a rotatable driven member having a friction clutch surface adapted to be engaged by the surface on said weight member, and means for preventing any substantial outward movement of the weight member until a predetermined speed of rotation is attained and then suddenly acting to permit the instantaneous full outward movement of the weight member, and the tight engagement of said clutch surfaces comprising a cam member engaging the weight member, and a spring fixed at one end to the rotatable driving member and bearing said cam member at its other end.

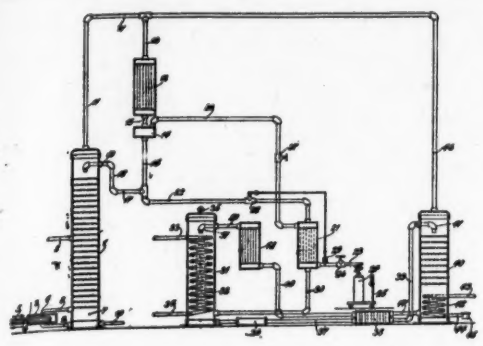
1,738,126—REFRIGERATING APPARATUS. Elmer O. Stout, Dayton, Ohio, assignor to Frigidaire Corporation, Dayton, Ohio, a Corporation of Delaware. Filed Nov. 26, 1928. Serial No. 321,782. 10 Claims. (Cl. 62—141.)

1. A water cooler adapted to be placed adjacent a mechanical cooling unit of a refrigerator comprising a plurality of elongated closed tanks placed in substantially parallel relation, a pipe at each of the ends of said tanks passing into and out of said tanks through openings in said tanks, and openings in said pipes within said tanks.

1,738,162—GRID FOR ICE PANS. James Rodney Weeks and Harold A. Greenwald, Detroit, Mich., assignors to Whitehead and Kales Company, River Rouge, Mich., a Corporation of Michigan. Filed May 28, 1928. Serial No. 281,320. 5 Claims. (Cl. 62—111.)

1. A receptacle for the production of frozen fluid in mechanical refrigerators comprising an open top pan, and a removable grid in said pan comprising a strip of flexible material provided longitudinally thereof with transversely extending substantially V-shaped corruga-

IN THE REFRIGERATION INDUSTRY



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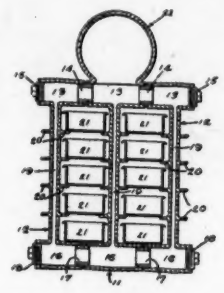

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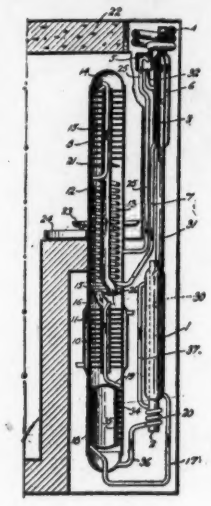

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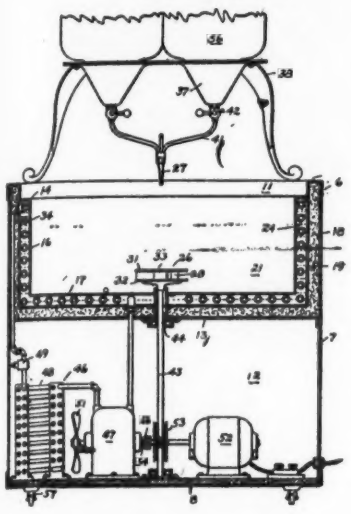

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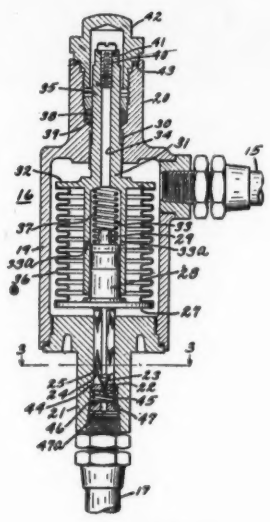

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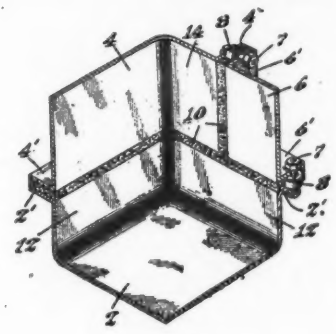

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tions of substantially uniform depth, certain of said corrugations having their apices extending transversely of the pan adjacent the upper edges thereof and having their side walls diverging downwardly from said apices toward the bottom of said pan.

1,738,233—REFRIGERATION. Fernan O. Conill, Marseille, France. Filed Jan. 16, 1923. Serial No. 612,886. 8 Claims. (Cl. 62—170.)

1. The herein described art of filling refrigerating apparatus with a solution having dissolved therein a liquefiable gas, which consists in evacuating the apparatus to remove air therefrom, reducing the temperature of the apparatus below that of the prepared solution, and thereupon introducing into the apparatus a predetermined quantity of said solution.

1,738,236—VALVE. Charles F. Fernald, Weston, Mass., assignor to Barnes & Jones, a Copartnership consisting of Walter E. Barnes, Wellesley, Mass., and William T. Jones, Newtonville, Mass. Filed Sept. 17, 1928. Serial No. 306,336. 8 Claims. (Cl. 286—58.)

1,738,248—VALVE. William T. Jones, Newtonville, Mass., assignor to Barnes & Jones, a Copartnership consisting of Walter E. Barnes, Wellesley, Mass., and William T. Jones, Newtonville, Mass. Filed Sept. 17, 1928. Serial No. 306,392. 5 Claims. (Cl. 236—58.)

1,738,270—REFRIGERATING SYSTEM. Glenn Faber Zellhoefer, Bloomington, Ill. Filed Nov. 10, 1925. Serial No. 68,083. 8 Claims. (Cl. 62—170.)

1. A method of refrigerating which comprises, dissolving a solute in a solvent, conveying the solution so formed to a recovery chamber, applying heat to the solution to cause substantially complete separation of the solute from the solvent, the heat being sufficient to maintain the solute in a molten state, and returning the solute to effect a redissolution.

1,738,342—REFRIGERATING SYSTEM. Glenn Faber Zellhoefer, Urbana, Ill. Filed Sept. 3, 1926. Serial No. 133,395. 4 Claims. (Cl. 62—94.)

1. In a refrigerating system of the class described, in combination, a container adapted to contain a refrigerating medium comprising a solute and a solvent therefor, means adapted to convey off the resulting solution, means adapted to effect the substantially complete separation of the solute and the solvent by application of sufficient heat to vaporize the solvent and melt the solute, means to separately restore the solute and solvent to their normal physical states by solidifying the molten solute and condensing the vaporized solvent, each such restoring means being vented to the atmosphere whereby to subject the restored substances to atmospheric pressure.

1,738,476—REFRIGERATOR. Samuel Kaye, Columbus, Miss., and Chester A. Frick, Muncie, Ind.; said Frick assignor to said Kaye. Filed Nov. 18, 1926. Serial No. 149,048. 12 Claims. (Cl. 312—36.)

1. In a refrigerator, the combination with a refrigerant container open at its top, of a bottle receiving and dispensing container removably closing the top of said refrigerant container and supporting the bottles within said refrigerant container, said container having dispensing openings in its top wall to permit the dispensing of the bottles while the container is in position.

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17,518—MECHANICAL REFRIGERATION. Charles C. Spreen, Detroit, Mich., assignor to Kelvinator Corporation, Detroit, Mich., a Corporation of Michigan. Filed June 12, 1929. Serial No. 370,389. Original No. 1,711,252, dated Apr. 30, 1929, Serial No. 125,186, filed July 27, 1926. 6 Claims. (Cl. 62—95.)

1. In a mechanical refrigerating apparatus of the compressor-condenser-flooded-expander type, an expansion unit comprising a plurality of sections connected with their interiors in operative communication, a chamber for the reception of control valve means integral with one of said sections with its interior in operative communication with the interior of said section, and control valve means operatively positioned within said chamber.

1,738,678 — REFRIGERATION. Baltzar Carl von Platen, Carl Georg Munters, and Sigurd Mattias Bäckström, Stockholm, Sweden, assignors to Electrolux Servel Corporation, New York, N. Y., a Corporation of Delaware. Original application filed June 3, 1927, Serial No. 196,179, and in Sweden June 9, 1926. Divided and this application filed Mar. 3, 1928. Serial No. 258,963. 5 Claims. (Cl. 62—119.5.)

2. In an absorption system, a plurality of evaporators connected in series, a condenser connected to supply liquid refrigerant in parallel to the evaporators, and means to flow an inert gas through the evaporators.

1,738,720—REFRIGERATION. Carl Georg Munters, Stockholm, and John Gudbrand Tandberg, Lund, Sweden, assignors to Electrolux Servel Corporation, New York, N. Y., a Corporation of Delaware. Filed June 15, 1926, Serial No. 116,111, and in Sweden Dec. 2, 1925. 39 Claims. (Cl. 62—179.)

1. The method of moving a fluid in a closed cycle which comprises interposing a porous flow resistance in the cycle, introducing a supplemental fluid on one side of the porous flow resistance to cause a drop in partial pressure of the cycle fluid and movement of fluid in direction through the resistance to the said one side, separating the supplemental fluid from the cycle fluid and removing it from the cycle before the cycle fluid has passed through the cycle to the other side of the porous resistance.

1,738,879—FROZEN CONFECTION AND METHOD OF PRODUCING SAME. Frank W. Epperson, Oakland, Calif. Filed Oct. 1, 1925. Serial No. 59,818. 3 Claims. (Cl. 62—172.)

1. The method of forming a frozen confection which comprises simultaneously atomizing and mixing with air the different ingredients of the confection to form a common centrifugally thrown spray thereof, and throwing said spray into a space maintained at a freezing temperature for said ingredients.

1,739,017 — REFRIGERATION. Isidor Bertram Ross, New York, N. Y. Filed Apr. 29, 1927. Serial No. 187,448. 3 Claims. (Cl. 62—1.)

1. As an article of manufacture, a gelatinous mixture of high heat conductivity, solidifying at a relatively low temperature, and composed of gelatin, gum arabic, ammonia nitrate, glycerin, denatured alcohol and water in substantially the proportions set forth, and a closed container of heat conducting material for the mixture.

1,739,544 — REFRIGERATION. Richard John Cracknell, London, England, assignor to Electrolux Servel Corporation, New York, N. Y., a Corporation of Delaware. Filed Feb. 16, 1928, Serial No. 254,714, and in Great Britain Feb. 18, 1927. 10 Claims. (Cl. 62—119.5.)

1. Refrigerating apparatus comprising a cylindrical drum, a plate dividing the drum into an evaporator portion and an absorber portion, absorber disks in the absorber portion, a gas conduit connected to the evaporator portion passing through the absorber disks, a heat exchanger, a conduit connected to the heat exchanger passing through said gas conduit and arranged to discharge liquid on the absorber disks, a generator, conduits connecting the generator with the heat exchanger, the heat exchanger being arranged to receive liquid from the absorber disks, evaporation means in the evaporator portion, and means connecting the evaporation means with the generator including a condenser.

1,739,639—REFRIGERATING APPARATUS. Jesse G. King, Dayton, Ohio, assignor, by mesne assignments, to Frigidaire Corporation, a Corporation of Delaware. Filed Dec. 1, 1924. Serial No. 753,043. 9 Claims. (Cl. 62—8.)

1. A system of refrigeration comprising, in combination, a closed circuit including an evaporator, means for expanding the refrigerating medium in the evaporator and withdrawing the medium from the evaporator and condensing the same, a valve for controlling the passage of medium from the high pressure side of the circuit to the evaporator, and means responsive to pressure on the high pressure side of the circuit and operated when a quantity of liquid medium accumulates in the high side of the circuit for opening the valve.

1,739,655—REFRIGERATING APPARATUS. Sylvester M. Schweller, Dayton, Ohio, assignor, by mesne assignments, to Frigidaire Corporation, a Corporation of Delaware. Filed Oct. 3, 1923. Serial No. 666,246. 3 Claims. (Cl. 62—8.)

1. A refrigerating system comprising, in combination, a fluid circuit having high and low pressure portions; means for circulating refrigerating fluid within said circuit; and means responsive to normal conditions of the fluid in said circuit for controlling the flow of fluid from the high pressure portion to the low pressure portion, said means including a second means responsive to an abnormal condition of said fluid for interconnecting the low pressure portion with the high pressure portion.

1,739,723 — REFRIGERATING APPARATUS. Jesse G. King, Dayton, Ohio, assignor, by mesne assignments to General Motors Research Corporation, Dayton, Ohio, a Corporation of Delaware. Filed April 30, 1923, Serial No. 635,433. Renewed June 29, 1929. 3 Claims. (Cl. 297—8.)

1. In a temperature responsive valve, the combination with a body for receiving a fluid and provided with a valve seat element; of a movable valve stem element co-operating with said valve seat for controlling the flow of said fluid; a thermostat including a closed expansible and contractile fluid container and a spring within said container normally tending to maintain the valve stem element in a certain position, said thermostat being enclosed within said body for actuating said valve elements relatively to one another, and means operable from the exterior of the body for adjusting the tension of said spring to control the temperature at which said thermostat opens or closes said valve.

1,739,750—PROCESS FOR EVAPORATING REFRIGERANT LIQUIDS. Samuel C. Carney, Tulsa, Okla., assignor to Shell Petroleum Corporation, a Corporation of Virginia. Filed November 26, 1926. Serial No. 150,760. 4 Claims. (Cl. 62—178.)

1. A process of refrigeration which consists in evaporating the lighter part of a liquid hydrocarbon refrigerant having components of different relative volatility while maintaining the other part of the refrigerant in the liquid phase; withdrawing the evaporated part; condensing said evaporated part; and reintroducing the condensed part into the residual body of the liquid refrigerant.

1,739,895—COOLING RACK. Harley M. Gamble, Wabash, Ind. Filed April 1, 1929. Serial No. 351,673. 2 Claims. (Cl. 211—74.)

1. A cooling plate having a plurality of receptacle receiving holes therethrough and depressions from the upper surface spaced therearound near the outer edges, a post under each of said depressions, a neck projecting from each post through said plate into the respective depression, and a head peened over from the top of said neck within said depression and having its upper surface below the level of the top surface of said plate.

1,739,978—OFF-CENTER BRACKET FOR ICE CANS. Joseph A. Martocello, Philadelphia, Pa. Filed July 29, 1926. Serial No. 125,644. 12 Claims. (Cl. 62—159.)

1,739,979—SYSTEM FOR AERATING ICE CANS. Joseph A. Martocello, Philadelphia, Pa. Filed February 15, 1927. Serial No. 168,267. 6 Claims. (Cl. 62—159.)

1,740,135—CONTROL-VALVE MECHANISM. William Wishart, Clinton, Iowa, assignor to Climax Engineering Company, a Corporation of Delaware. Filed July 20, 1925. Serial No. 44744. 2 Claims. (Cl. 137—139.)

1. In combination with a casing, a valve member therein, an oscillatable member, means for actuating said member, a swingable member abutting said oscillatable member, means for bringing said swingable member into position for operating said valve, said means including a collapsible bellows, a bracket on said bellows, and a second bracket pivoted to said first mentioned bracket and engaging said swingable member.

1,740,237 — REFRIGERATOR LINING AND METHOD OF MANUFACTURING SAME. Oliver P. Greenwood, Billerica, and Hoyland B. Bettinger, Waltham, Mass.; said Greenwood assignor to Saco-Lowell Shops, Lowell, Mass., a Corporation of Massachusetts. Filed March 5, 1927. Serial No. 173,203. 10 Claims. (Cl. 220—9.)

1. A refrigerator box comprising a series of sheet metal sections, means for securing said sections together with spacers separating adjacent walls of said sections, and a filler closing the spaces between the sections.

1,740,281 — REFRIGERATING SYSTEM. Samuel C. Carney, Tulsa, Okla., assignor to Shell Petroleum Corporation, a Corporation of Virginia. Filed August 21, 1925. Serial No. 51,559. 7 Claims. (Cl. 62—179.)

1. In a refrigerating process the step of reclaiming an expanded hydrocarbon refrigerant, which consists in subjecting a vapor of the refrigerant to the absorbent action of a liquid hydrocarbon capable of effecting substantially complete absorption of the vapor; and then redistilling the liquid containing the vapor to segregate the absorbed vapor from the liquid.

1,740,336—HEATING AND COOLING OF BUILDINGS. Richard Godfrey Crittal and Joseph Leslie Musgrave, London, England. Original application filed September 20, 1923, Serial No. 663,861, and in Great Britain November 10, 1922. Divided and this application filed June 22, 1926. Serial No. 117,773. 4 Claims. (Cl. 257—8.)

1. In a building, the combination with a concrete surfacing structure, of a pipe for the flow of a heating or cooling fluid therein to heat or cool the interior of the building and embedded in the concrete of said structure near the surface thereof, and reinforcing material surrounding and spaced from said pipe in tubular form and embedded in the concrete.